THIS WEEK'S National Petroleum NEWS

Index to Coming Meetings

Nebraska Independent Oil Men's Association, Paxton Hotel, Omaha, Neb., Dec. 11, 12, 13.

National Oil Show, Sherman Hotel, Chicago, Jan. 19 to 25.

Independent Oil Men's Association of New England, American House, Boston, Mass., Jan. 22, 23, 24.

Wisconsin Petroleum Association, Hotel Pfister, Milwaukee, Jan. 28, 29.

Iowa Petroleum Association, Fort Des Moines Hotel, Des Moines, Ia., Feb. 11, 12.

Ohio Petroleum Marketers Association, Deshler-Wallick Hotel, Columbus, O., Feb. 19, 20, 21.

Michigan Oil Men's Association, Statler Hotel, Detroit, March 19, 20, 21.

American Association of Petroleum Geologists, Roosevelt Hotel, New Orleans, La., March 20, 21 and 22.

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WILLIAM N. DAVIS, newly elected vice president of the American Petroleum Institute, heading the production division, has been outstanding in oil development and association work in the Mid-Continent District for years. Late in November he was elected president of the Mid-Continent Oil & Gas Association for the seventh consecutive time. During the past year he has made a vigorous and effective campaign through that association for unit development of oil fields which campaign resulted in the setting up of definite mode of procedure and the endorsement of the idea by the American Petroleum Institute.

Mr. Davis formerly was an individual operator under the firm name of Foster and Davis. Several years ago he was elected a vice president and director of the Phillips Petroleum Co. which position he now holds. He rendered outstanding service to the industry when he first became president of the Mid-Continent association by leading the defense against proposed oppressive federal taxes. With others he saw the need several years ago for public relations work conducted through the American Petroleum Institute. He lives in Bartlesville.

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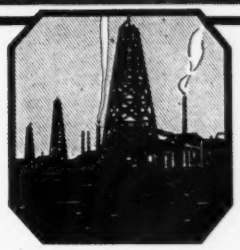

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Next Few Months in Gasoline Making Critical for 1930 Profits

By J. C. Chatfield
N. P. N. STAFF WRITER

CHICAGO, Dec. 5.

OUR Industry's prosperity in 1930 will depend as much on the attitude of individual refiners as on conservation of production.

The scale of operations of U. S. refineries in the next three or four months will have a critical bearing on the situation in view of the large carry-over of gasoline stocks which will have to be liquidated.

The increase in demand for gasoline in 1930 will be approximately 8 per cent over 1929, a smaller increase than was experienced in 1929.

Stocks of finished gasoline in the U. S. available for market requirements are actually much larger than those shown by the Bureau of Mines since millions of barrels are held at large depots outside of refineries.

These were outstanding developments of opinion at the tenth annual meeting of the American Petroleum Institute at Chicago.

Official recognition of the serious overproduction of gasoline was taken by the board of directors of the Institute. By resolution the directors agreed to send a representative to the business conference of the Chamber of Commerce of the United States at Washington, Dec. 5, which was called at the request of President Hoover. Capt. J. F. Lucey of the Lucey Petroleum Co., Dallas, was appointed to represent the Institute and present a statement of the condition and outlook of our industry.

The Institute statement, as drafted by the directors, points out to President Hoover and the Chamber of Commerce that the next three months will be critical and that the refining branch of the industry cannot be operated at its present rate without a serious overproduction. Instead of continuing normal operations the refiners are faced with a problem of liquidating about 8,000,000 barrels of gasoline over-produced in 1929. Following is the statement in full:

"The petroleum industry is strikingly important in its relation to the economic life and social welfare. It occupies, by force of the essential nature of its products, a position of outstanding significance to general prosperity. It is closely related to all industry and to the everyday life of the individual. If the revolutionary industrial changes of recent years have been in speed and spread, rather than in fundamental structure, as the committee on recent economic changes of the President's conference on unemployment believes, the petroleum industry reflects the impulse of the times to a notable extent.

"FOR several years past there has existed a condition of overproduction both of crude oil and refined products, including gasoline. The thought in the industry has been directed toward an effort to remedy this situation, with a view to more nearly balancing production and consumption of crude oil and the principal refined products.

"It is now possible to say that the supply of crude oil in the United States, by voluntary action on the part of individual producers in the several states in this country, has been curtailed to approximate equilibrium with current refinery demand. This has been in part fulfillment of the expressed recommendation of the Federal Oil Conservation Board that the industry itself take steps to conserve the petroleum supply.

"THE refinery demand for crude oil in 1929, however, has been inflated to the extent that gasoline has been overproduced by approximately 8,000,000 barrels, which gasoline must be liquidated in 1930. It is, therefore, obvious that the current level of refinery demand for crude oil can be maintained only by virtue of further overproduction of gasoline.

"In the petroleum industry a condition of gasoline overproduction is recognized as existing and is promising to grow more serious and acute if the supply of this commodity is not promptly and substantially curtailed, and the first quarter of 1930 is regarded as a particularly critical period during which gasoline stocks threaten to mount to uneconomic and unsound levels.

"Unless the refiners, through education and knowledge of the situation, restrict their production of gasoline to market requirements, the continued conversion of crude oil into gasoline at too rapid a rate, would nullify the effects of the curtailment, already accomplished, in the supply of crude oil."

The ideas of students of economic conditions of the country with reference to probable future demand for gasoline were remarkably alike, as presented at the Institute meeting. A poll of statisticians and economists

was taken at a meeting of the advisory committee on statistics.

Eleven statisticians were asked to put down the results of their studies in terms of per cent of expected increase in gasoline demand in 1930. The average of the 11 were found to be 8.34 per cent.

The lowest estimate of expected increase was 7.5 per cent and the highest 10 per cent. It is understood that the 10 per cent estimate was made by a California man and the thought was expressed by some that he had placed the figure that high partly because of the tremendous advance sale of California gasoline contracted for movement through the Panama canal in 1930 to Atlantic ports. It will be apparent from the close approximation of the 8.34 average to the minimum prediction of 7.5 per cent that most of the economists look for an increase of about 8 per cent.

In the Dec. 4 issue of NATIONAL PETROLEUM NEWS a statement of W. M. Irish of the Atlantic Refining Co. was recorded which showed that that company is anticipating an 8 per cent increase in gasoline demand.

The advisory committee of statistics recommended that the Institute collect more complete figures on gasoline stocks.

Means of collecting figures of gasoline outside refineries, particularly at tidewater terminals and large jobbing plants, will be sought. It was estimated during a discussion at one meeting of the committee that Bureau of Mines statistics on gasoline stocks probably represented not a great deal more than one half the actual stocks in the country.

At present figures on complete stocks are compiled in only Pacific coast territory. Elsewhere in the country away from refineries are millions of barrels of gasoline held as working stocks in tidewater terminals and scattered through refining company and jobbers' tanks. These stocks are usually very large in the early part of the year in anticipation of advances in the tank wagon prices of gasoline.

The committee voted to recommend to the A. P. I. officers that the Institute's statistical department be provided with funds ample to proceed with the collection of additional statistics which were recommended by the committee earlier this year. It was said the activities of the department were hampered at present by an appropriation which precluded a larger range in fact gathering.

It was also decided that the committee should meet periodically so members might compare their work and methods.

It is probable that a special committee from the advisory committee will call early next year on the Bureau of Mines to work out changes in the government's statistical reports so that 1930 data may be compiled in the altered form.

General satisfaction was evident at the Institute meeting over the progress which has been made during the year in voluntary conservation in the various states. As was indicated in the statement sent to the Washington conference the Institute takes pride in the fact that our industry has been able to bring crude production to a level which approximates current refinery demand.

Looking forward to more effective methods of conservation the Institute took its first action approving unitization of oil pools as they may be discovered in the future. It is significant that the action was taken so closely following the approval of unitization and the setting up of definitions and rules of practice by the Mid-Continent Oil & Gas Association.*

Following is the resolution as adopted by the board:

"WHEREAS Unit development and operation of (single) oil pools secures the maximum ultimate recovery of the oil and gas; the development of the pool at a minimum cost and economical production; the most efficient utilization of the natural gas in the production of the oil and elimination of its waste; and, in general, the conservation of the oil and gas and prevention of waste attendant on over-production;

"NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the American Petroleum Institute, that it endorses the policy of unitization of oil pools and recommends it to the industry throughout the United States wherever practicable, and

"BE IT FURTHER RESOLVED by said Board of Directors that in cases where unitization is found to be unattainable, or impossible, every effort should be made to effect a cooperative agreement between the parties interested in the potential pool, to insure orderly and economical development and production and the prevention of waste arising from over-production; and

"BE IT FURTHER RESOLVED that a standing committee of this Board be appointed, charged with the duty of cooperating with committees of other organizations in promoting the general adoption of the unitization practice.

*See NATIONAL PETROLEUM NEWS, Dec. 4, 1929, P. 30.

To Meet in November Next Year

THE 1930 meeting of the American Petroleum Institute will be held in November instead of December it was decided by the executive committee of the board. Better weather conditions are to be expected in that month and California members will not have to leave at Thanksgiving time as they did this year.

The meeting is scheduled for Nov. 10, 11, 12 and 13. It will be held at the Stevens hotel at Chicago as usual.

American Petroleum Institute report on refinery operations in the United States for the week ended Dec. 7, compared with the week ended Nov. 30

Districts	Per Cent of Capacity Reporting	Daily Av. Crude Run to Stills Wk. Ended 12-7 (Barrels)	Daily Av. Crude Run to Stills Wk. Ended 11-30 (Barrels)	Per Cent of Reporting Capacity Operated Wk. Ended 12-7	Per Cent of Reporting Capacity Operated Wk. Ended 11-30	Stocks Reported in Thousands of Barrels: Gasoline Stocks Dec. 7	Gasoline Stocks Nov. 30	Gas & Fuel Oil Stocks Dec. 7	Gas & Fuel Oil Stocks Nov. 30
East Coast	100.0	446,400	484,300	73.7	80.0	4,926	4,641	8,255	8,537
Appalachian	91.2	78,300	84,400	67.0	72.6	1,038	997	819	828
Ind.-Ill.-Ky	98.6	253,700	294,600	71.5	83.0	4,331	4,461	3,714	3,936
Okla.-Kan.-Mo	88.6	282,100	291,300	68.9	71.6	2,876	2,753	3,624	3,846
Texas	90.3	509,100	525,500	72.7	75.0	5,971	5,545	13,709	14,114
La.-Ark	95.1	193,800	173,000	67.8	60.5	1,880	1,694	4,683	4,885
Rocky Mountain	92.9	55,500	59,000	40.1	42.7	1,902	1,851	9,990	1,000
California	99.3	611,800	623,700	68.6	70.0	14,377	14,266	109,111	109,311
Total U. S.	95.3	2,430,700	2,535,800	69.4	72.5	37,301	36,208*	144,905	146,457
Texas (Gulf Coast)	99.4	399,200	414,600	76.3	79.2	5,047	4,635	10,675	10,903
La. (Gulf Coast)	100.0	139,700	122,300	78.7	68.9	1,644	1,476	3,928	4,141

*Revised due to addition in California stocks.

Code Changes Debated in Secret Meeting Of Institute Directors

By V. B. Guthrie
N. P. N. MANAGING EDITOR

MARKETING practices at variance with the code being carried on by the big oil companies took the attention of the board of directors of the American Petroleum Institute during the best part of two days at the general Institute meeting here.

These board meetings, as is the practice of the Institute, were held in secret. All that was issued by the Institute concerning the discussion among the heads of the big companies the men who drew up the code was two short resolutions and a memorandum concerning the appointment of a special committee.

NATIONAL PETROLEUM NEWS publishes the following account of these discussions based on the best information it could secure as to what transpired.

The questions at issue concerned the use of lease and agency agreements as a subterfuge to allow the giving of equipment and services to dealers, which is prohibited by the code under open accounts with dealers; the painting of stations; commercial discounts and the giving away of petroleum products at opening days of oil company stations.

While lease and agency agreements have been used by some oil companies for some time on certain classes of dealer accounts, it was brought out that some companies now are making short term contracts with dealers controlling gallonage sometimes as small in volume as 3000 gallons a month, with dealers with curb stations, or with stations on rented land and not on property owned outright by the dealer.

It was said old equipment was being bought up by the oil company under such lease and agency agreements, made sometimes for only 30 days, and new equipment was being installed; that electric signs were being put in; drives repaired and extensive painting done.

Rentals being paid by the oil companies under these agreements were said to be up to one cent a gallon, and sometimes a flat amount per month. In addition the oil companies were said to be giving the dealer agent a commission on his gasoline sales of from three cents up to four and five in some cases.

Companies whose names were mentioned as using the lease and agency agreements of one kind or another were the Shell Petroleum Corp., Pan American Petroleum, Standard Oil Co. of Ohio, Standard of Indiana, Standard of Kentucky, and Pure Oil Co.

There was a great deal of debate at the Institute board meeting concerning what constituted a fair use of the lease and agency agreements. The companies objecting said they did not question the principle of such contracts but rather the terms under which they were being carried out now, in many cases with verbal concessions granted before the contracts were signed, which were not included in the contracts. In some cases oil companies were said to be going to persons who had secured property and proposed to build a station and agreeing to finance construction of the station.

As a result of the discussion on this subject the Institute board adopted a resolution stating that a lease and agency agreement must be a bona fide lease for at least a year, without the right of the lessor to cancel, and that it should state the actual consideration involved between the oil company and the dealer and that it must be filed for record in the oil company's office, just as its prices are posted under the code as a matter of record.

H. T. Klein, The Texas Co., chairman of the institute committee on interpretation of the code, stated that the chief elements of real lease and agency agreements, as contrasted with other arrangements between the oil company and dealers, were as follows: that the dealer was the direct agent of the oil company and the oil company therefore responsible for his acts; that the oil company retained title to its products sold by such dealers; that the dealer agreed to abide by the oil company's rules and that the oil company fixed the price at which products were sold.

DISCUSSION over the right of the oil company to paint stations for its dealers precipitated considerable discussion among the institute directors also. Under Rule 10, in the second group of rules in the oil marketing code, the painting of dealers' properties is prohibited except for standard signs of the oil companies.

The Shell Co. precipitated the discussion here by stating that it considered the painting of stations as legitimate advertising expense. It pointed out that this practice had been followed by oil companies on the Pacific Coast for a long time. The Shell company has been extending this practice outside of Pacific Coast territory, it was brought out.

C. M. Fuller, president of the Richfield Oil Co. of California, advocated the right of the California companies to continue this practice and introduced a motion that the code be amended to allow the continuance of this practice west of the Rockies. He was supported by President Kingsbury, of the Standard of California. The heads of the marketing companies in the east were opposed to such a letting down of the provisions of the code.

THE discussion went to the point that it is said Sir Henri Deterding, general managing director of all the Royal Dutch-Shell interests, was appealed to to bring the Shell interests in this country into line, and that Col. Klein wanted to tender his resignation as chairman of the committee on interpretations unless the interpretations of the committee were allowed to stand.

In the end, however, the board adopted a resolution suspending Rule 10 for the Pacific Coast states and for these territories in Utah, Idaho and Montana which the state committees on the code might decide upon. This was to prevent the extension of this practice in any territory except where it has previously been carried on.

Commercial discounts was another question under the code which evoked much discussion at the Institute directors' meetings. The clause in the code which eliminates the necessity of posting prices at which commercial accounts are sold by the oil compand has caused as much dispute as any part of the code. Many companies are in favor of cutting out entirely the giving of commercial discounts.

On the other side of this question, however, stood the Gulf Refining Co. and the Atlantic Refining Co. G. R. Nutty, president of the Gulf company,

stated that it was the business policy of his company to give commercial discounts to salesmen's cars, superintendents' cars, inspectors' cars and other cars licensed in the name of the company, but not to cars licensed in the name of individuals, and that his company would continue to write commercial accounts and allow this class of discounts.

Mr. Nutty proposed a resolution amending the code to allow the giving of discounts to all commercial cars, that is cars licensed in the name of the company, whether trucks or passenger cars. He was seconded in this by R. D. Leonard, vice president of the Atlantic Refining Co., who stated this was the policy of his company. The resolution was voted down by the directors.

Mr. Nutty said he had written to the Federal Trade Commission that his company would abide by the code except where its provisions were at variance with "fair business practice."

It was brought out that the eastern committee on the code had asked the institute directors to do away entirely with allowing discounts to the commercial trade. The outcome of the discussion was that Henry M. Dawes, of the Pure Oil Co., was named to appoint a committee to consider the question.

Discussion concerning the giving away of products on opening days at stations was said to revolve around the practice of the Phillips Petroleum Co., which is one of the companies which it is said has not signed the code.

The company refused to go on record at the meeting as to what its future policy would be in this regard. Rule 16 of the code says that "No oil or other thing of value shall be given away, or special inducement granted, on opening days, special sale days or other occasions."

Lease and Agency Agreements Disturb Independents

CHICAGO, Dec. 5

THE extension of lease and agency agreements to classes of dealer trade not entitled to them was cited several times as the principal reason Independent marketing companies are not signing the code of ethics, in the open group meeting of the Institute on the code here today.

Representatives of the state marketers' associations and individual Independent marketers referred to it as a subterfuge on the part of the big companies to put in equipment for dealers. which was otherwise forbidden under the provisions of the code.

Only about 200 or 300 men at the most attended this open meeting and they were in the great majority the representatives of the Independent portion of the marketing industry.

Roy B. Jones, Panhandle Refining Co., chairman of the general Institute committee on the code, presided in the early part of the meeting, later turning the chair over to H. T. Klein, The Texas Co., chairman of the Institute committee on interpretation of the code. W. R. Boyd, Jr., executive vice-president of the Institute, spoke briefly urging the industry generally to support it and saying that 5000 companies over the country had now signed the code.

The program for the meeting announced that representatives from the state and district committees would be called upon to report for each state. However, in only a few cases were such representatives present to report when their state was called.

For Ohio W. A. Milne, secretary of the Ohio Petroleum Marketers Association, stated that, of 650 marketing companies in the state, 183 had signed the code, but the signatures of 71 were being held before being sent to the Federal Trade Commission until it was seen how conditions in the state as regards the lease and license agreement worked out.

Mr. Milne said the principal disturbing cause in the state was the lease and license agreements and that his association had filed with directors of the Institute a resolution signed by the Ohio committee asking for an amendment to the code placing some regulation over these contracts. J. L. Marsh, Youngstown, Ohio, and Wm. F. Burke, Kentucky Consumers Oil Co., Covington, Ky., also spoke on conditions in Ohio.

In Wisconsin it was brought out that 54 per cent of the 352 jobbers in the state, representing 62 per cent of the gallonage, had signed to accept the code. In Indiana 77½ per cent of the gallonage had signed up.

Paul Hadlick, Minneapolis, secretary of the Northwest Petroleum Association, introduced a resolution for the consideration of the general code committee, asking that a provision be introduced in Group I rules in the code forbidding the payment by the refiner or jobber of all secret rebates, refunds, cash discounts and other unfair trade commissions.

Code on Oil Marketing Worth $100,000,000

WASHINGTON, Dec. 9.—What, in dollars, is the annual value, to the petroleum industry, of its code of marketing practices? Such an inquiry, it developed today, has been addressed by the Federal Trade Commission to petroleum industry organizations.

"Any estimate of the monetary value to the petroleum industry resulting from elimination of unfair and uneconomic practices through its trade practice conference must be more or less of a guess," said the secretary of one oil association. "Taking the United States as a whole, I would say there is an annual saving of $75,000,000 to $100,000,000."

That the trade commission is making such an inquiry was brought out in that body's annual report to congress. Only one answer for each industry addressed was mentioned in the report. Not all industries that had adopted agreements were listed as having made responses. Answers from a branch of the grocery business, the steel furniture, waxed paper, wood working, creamery, paint, scrap iron, spice grinding and insecticide industries were listed.

The waxed paper man estimated the value of a code of practices to his industry at $150,000. The wood-working machinery industry said the agreement was of "incalculable value," the creamery industry "hundreds of thousands" and the steel furniture industry "between $2,000,000 and $3,000,000."

In the part of the report devoted to the work of the trade practice conference division, the commission says "the value of the trade practice conference to various industries, both morally and financially, is vouched for by representatives of the industries involved who have generously replied to queries sent out by the commission on this subject."

In the course of 1929, the report shows, 31 trade practice conferences were held and agreements resulted. That was more than double the number held the year before. Each of the conferences is summarized so that congress will know what happened.

"With more than 95 per cent of the petroleum refining industry of the United States present or represented," says the summary about the oil agreement, "this conference was one of the largest held during the year."

This year's report is remarkable in that the petroleum industry is not mentioned in it in any way except in connection with the trade practice conference. Time was when the industry received much more than a welcome share of the publicity resulting from annual and special reports of the federal trade body.

Ten Points to Keep in Mind on the Code

By Henry M. Dawes
President Pure Oil Co.

THESE ten points for oil men to keep in mind in their consideration of the code of marketing practices were presented by Henry M. Dawes, president of the Pure Oil Co., at the group meeting on marketing practices Dec. 4. Mr. Dawes presided at this session. His remarks have been edited for the sake of brevity, but the wording on the ten points as given below is his own.

1. Nothing permanent is accomplished except through evolution. If we attempt to revolutionize the marketing of petroleum products overnight we will not only fail in our objective, but we will slip back. Do not, therefore, be discouraged that our objective has not been reached, but rather take inspiration from the fact that every step we have taken is a forward step and we have nothing to retrace.

2. Be patient with the "majors." They have made progress. They have even gotten to the point where most of them admit that many of the marketing troubles of the industry are of their own making. Large bodies move slowly and in such rare cases as one-man control of the destinies of a corporation he has to base his decisions as much on propaganda as fact.

Try to cultivate a little sympathy for the big fellow. He is not crooked and he is not stupid. He is probably quite as well aware as you that there is money in the Golden Rule, properly applied, but he has to make his application in a thousand different places where you have one.

3. To the little independent and the little jobber I have only one word. Don't be so suspicious. If you think you find bad faith on the part of the big fellow and his representative is either a liar or a well intentioned fool, go direct to the big fellow himself. He will welcome you.

4. Go on the hypothesis that you are not making any sacrifice when you give up a practice which is bad for the industry.

5. Always remember that the industry which serves its public best prospers most. If, through increased efficiency and open dealing, economies are effected, the fruits thereof will be shared equally by the public and by the industry. It is not necessary to apologize, therefore, for this movement, and to do so is an indication of your lack of understanding of its fundamental impulse.

6. Do not be secretive. The whole movement is dependent upon the principle of letting in light and air. A secret agreement to do a right thing is wrong and ineffective. If you haven't a guilty conscience you need not pull the curtains down when you talk about your business. The marketing of petroleum products is not a game in which we are engaged to defeat our opponent, but it should be, and this effort is, a cooperative march of a great army towards a worthy objective.

7. Don't be foxy. You may be smart enough to comply technically with certain rules and defeat their spirit. You may think you are making money by this, and you may actually do so for a short time, but you not only injure the industry but you brand yourself.

8. Use a little detachment in looking at your own particular problems, and consider the other fellow's, not just because you are an altruist but because you are intelligent. When you meet him be as quick to realize the necessities and difficulties of his position as you are to urge upon him your own complaints.

9. It seems to me the most natural thing in the world for a man to ask that he should be able to make exceptions to particular provisions in the code. It is natural to ask for anything that attracts our fancy or excites our cupidity. To expect to get it is another thing. There is no marketer, whether corporate or individual, who is in precisely the same position as any other marketer. If the principle of exceptions were to prevail there would not be a single clause left in the code that some one was not violating. You have a perfect right to advocate changes in the provisions of the code, but do not make yourself ridiculous by publicly asking that you be made teacher's pet.

10. Let everybody keep in mind—this means majors and minors, producers, refiners, all classes of distributors—that a powerful body of public opinion is pretty thoroughly disgusted with the industry's incapacity, or unwillingness, to solve its own problems, to clean its own house, to stabilize its business conditions. Down to the Dissolution Decree of 1911, there had been a long period of sharp public hostility to the industry's methods. After that decree a change came about, and for a considerable period the industry was permitted freedom to work out its own salvation.

Yet more recently, due to excesses of production and a persistent public fear that supplies were sooner or later liable to be dangerously depleted, there has been a revival of public apprehension about the industry's conduct, and suspicion that its larger policies, or lack of policies, have not been consonant with an adequate conception of the broadest public interest.

The petroleum problem is a world problem, and you cannot make a comprehensive survey of it from a seat astride the gable of a filling station.

It's up to the industry to get that comprehensive view; if it doesn't do it pretty soon there will be real danger of a new epoch of governmental, possibly even international, interference and regulation, with almost certainly disastrous results to many of us.

We cannot be catapulted to our goal, but we are, step by step, getting closer to it every day. Be prepared to bear your part of the burden and you will reap your share of the return. Do not scold, do not whine, but have faith, courage, persistence and charity, and above all do not quit.

DALLAS, Texas—Dealers of the Simms Oil Co. have been urged to approve the code of ethics in a booklet on the code issued by Simms. The booklet notified all employees and commission agents to familiarize themselves with the code as it was to be adopted by the company Dec. 1. It contains also the rules and interpretations of the code.

"Simms Oil Co. feels . . . that the acceptance and adoption of the code will result in greater stability, satisfaction and success for all those engaged in the merchandising of petroleum products; that the public, the automobile owner, will be better served and ultimately at a lesser cost as a result of the adoption of this code," said Edward T. Moore, president, in a letter to employees and dealers, published in the booklet.

The Editors' Viewpoint

National Petroleum News

Give All a Hand in Code Planning

By V. B. Guthrie
N. P. N. MANAGING EDITOR

DIRECTORS of the American Petroleum Institute are still handicapping the acceptance of the code of marketing practices by the industry at large by their failure to discuss the problems arising through the code frankly with the industry.

These directors, the heads of the larger marketing companies and also the men who drew up the code, were conspicuously absent from the general institute meeting at Chicago Dec. 5, where the code was openly discussed.

There have been but few occasions for the industry at large to meet and discuss the code with the men who drew up the code and presented it to the industry. With all the important oil marketing companies represented at the Chicago meeting by many men, there were only about 200 men, 300 at the most, at this recent group meeting and most of these were the secretaries of the state marketers' associations and men connected with the Independent marketing companies who were not in on the secret conferences and were entitled to know what it is all about.

The chairman of the meeting called for reports from the individual states as to the progress being made there in the adoption of the code. As state after state was called no one was present to report. Yet the men at the head of the code committees for those states and districts, or active members of those committees, were in attendance at the Chicago institute meeting.

In those state and district committee meetings questions have arisen regarding practices of the larger marketing companies which are perhaps vital to the success of the code there. Why could not those questions have been presented and discussed at this general open meeting on the code at Chicago, with the heads of those big companies explaining their position.

Directors of the institute spent the best part of two days at the Chicago meeting discussing the code behind closed doors. Their discussion concerned practices being followed by the larger companies now which are known throughout marketing circles generally and which have caused a hesitancy on the part of local marketing companies in themselves adopting the code.

All that was put out from those two days directors' meetings were two short resolutions, in themselves interpretations of provisions of the code. They were read and discussed briefly at the general meeting by H. T. Klein, of The Texas Co., chairman of the committee on interpretations of the code.

We thoroughly believe the entire industry should be taken into the confidence of the institute directors on all matters concerning the code. The code is just as important to the small marketers over the country as to the heads of the big companies. Perhaps the discussion by directors on the code could not have been entirely open to the oil men generally attending the Chicago meeting, due to the necessity for dispatch of business and the slowness with which opinion can be crystallized in an open meeting.

There should have been one open meeting of the directors on the subject where the heads of the larger companies could have been called on to give their reasons for practices followed by their companies under the debatable sections of the code.

Or at least the heads of these companies, or their sales managers at least, and their representatives on the state and district committees should have been present at the scheduled open meeting on the code.

It would have helped the independent marketing branch of the industry had those men been present both to give the point of view of their individual companies concerning various provisions of the code, also to hear the point of view which was brought to the meeting by the secretaries of many of the state marketing associations and representatives of local marketing companies. —V.B.G.

Code Encourages Sound Practice

(By R. R. Irwin, President White Eagle Oil & Refining Co.)

WHILE the Code of Ethics has had sufficient adoption and endorsement by the American Petroleum Institute and other oil organizations, still more unanimous signature is necessary to make the policing and enforcement of the code really effective.

It is difficult to correct unfair practices in any local territory where reliable marketers have failed to actually adopt the code. When these marketers realize that correction of improper, unfair marketing conditions in their immediate vicinity depends largely on their acceptance of the code, they will not continue the policy of holding back and assuming the code can get a fair trial without their support.

Here is an opportunity for the small marketer to have some voice in what constitutes fair trade practices; and he should not ignore it. It is very probable that the voice of the company not endorsing the code will become increasingly weak in the correction of troubles.

I note on the part of some the tendency to put the code on probation without doing anything to assist it. Even a perfect code can not exist and function without continued attention and support.

There is also a tendency to expect the code to correct errors in bad judgment and to somehow mitigate the penalty of poor selling policies.

To keep a place in the picture, it is more important now than ever before for each company to see that they have good, sensible sales representatives who can market products without apology and without resorting to secret slick deals. Some careful, sound thinking is necessary right now on marketing methods that are entirely outside of the code.

The adoption of the code is merely a beginning, a presumption of putting business dealings in the open. Only good sales organizations are willing to keep dealings in the open; and only such organizations should exist.

There is indication of discouragement in different quarters because of apparent violation of the code. It is weak and wrong to show a quitting spirit. Persistent and continuous effort should be made to improve the entire local marketing attitude. The thought should be kept in mind that the code provisions are not drastic—they are supposed to reflect good business judgment. It is doubtful if the violator of the code gains anything financially or morally in his deals against his competitors who are complying with the code.

There still is, and will continue to be, some argument as to interpretation of the code, and as to whether certain practices reflect its letter and spirit. In the absence of a definite interpretation, a good rule is to consider whether a given practice would be fair and logical if adopted by everyone in the business. If the practice will not stand this test, then it is doubtful if it is ethical.

So far as marketing ethics, or even price schedules, are concerned, they should be viewed by the question as to whether all factors in the industry should follow them, because this is what they will eventually do. The pioneer in any price or practice must realize that others seek and meet his action.

In all dignified competition, there are certain rules of the game. In business—as in sport—there is one rule more important than all the rest—keep cool. One might almost say—keep pleasant. This is the only way to keep within the rules. Don't do anything for spite—it's costly. Practically all champions in sport and business are fair and friendly, and do not create costly barriers between themselves and their competitors.

Value of Oil Field Safety Work Is Recognized

TO OUR mind one of the clearest demonstrations of the oil industry's concern for the welfare of its workers was given at the business session of the directors of the Mid-Continent Oil & Gas Association recently.

When the matter of safety first work for next year was brought up, D. J. Wallace, director of the safety division, was called into the meeting. He was prepared to review the work accomplished, and outline plans for the future. Mr. Wallace was not permitted, however, to deliver his speech.

E. B. Reeser, president of the institute and of the Barnsdall Refineries, Inc., and a director of the Mid-Continent association, promptly made a motion that the work be continued on the required budget. "I have read the report already sent out by Mr. Wallace," Mr. Reeser stated. "And I am familiar with the work that has been done."

James A. Veasey, chief counsel for the Carter Oil Co. in seconding the motion stated that he had originally opposed the organization of a safety division, but now he did not think it was even necessary for Mr. Wallace to explain any features of the work to the directors, in order to convince them of the necessity of carrying the work forward. The motion was carried unanimously.

This was in the face of the fact there is no legislation compelling the oil industry to take such a humanitarian interest in its workers.—A. S. J.

Taking a Stand on Christmas Gifts

THE Detroit Edison Co., a big public utility, has taken a stand against the commercializing of Christmas through the giving of gifts between either business houses who have had relations during the year, or between individuals connected with such companies.

The Edison company writes the W. C. Platt Co., publishers of the Oilgram as follows:

"Our records show you to be one of the companies with whom we have enjoyed business relations during the past year.

"As we again approach the Christmas season, we are writing to tell you of our attitude toward the practice of giving Christmas gifts to members of our organization, either within or without the Purchasing Department.

"This age old custom works a hardship on many companies and as you no doubt realize, is subject to misunderstanding.

"We are, therefore, sure that you will agree with us that the giving or receiving of Christmas gifts has no place in our present mutually satisfactory relations."

Company Name May Mislead

THE practice of using a word in a company name which will mislead the public as to the real activities of that company is not as much indulged in in the oil business now as some years back.

However, probably few people realize that such a practice is condemned by law and that the Federal Trade Commission for a number of years has been very active in enforcing the law.

In the oil industry this practice largely consisted in incorporating in a company name the word "refining," or perhaps "manufacturing" and on occasion even adding the word "producing," when the company perhaps was not engaged in any one of these three activities.

Just recently the Federal Trade Commission caused a truck parts manufacturer, who only sold parts, but did not make them, to take the word "manufacturing" out of his company name. About the same time the Commission caused a jobber of knit goods to take the words "knitting" and "mills" out of his name.

While a state will permit a company to incorporate almost anything under the shining sun, whether it operates in all those activities or not, nevertheless, the Federal Trade Commission acts under the law which says, "You shall not mislead the buyer as to who and what you are and what you have to sell." The Commission holds that, in holding out to the buyer that you are the manufacturer of the goods or that you have a factory some place when you haven't, is misleading the customer to his detriment.

Undoubtedly, if the point were ever raised with the Commission against some marketers who have the word "refining" and some who have the word "producing" in their name, the Commission would hold against that use.—W. C. P.

E. B. Reeser Re-Elected President Of Petroleum Institute

CHICAGO, Dec. 5

E. B. REESER, president of the Barnsdall Corp., Tulsa, was reelected president of the American Petroleum Institute at the tenth annual meeting which closed today. The selection was a recognition of the activity and accomplishments of Mr. Reeser in the past year.

In line with a reorganization of the Institute structure to give greater recognition to the marketing branch of our industry and to simplify the organization structure the number of vice presidents was increased to four. In the future there will be one vice president at large and one for each of the producing, refining and marketing divisions.

L. P. St. Clair of the Independent Oil Producers Agency, Los Angeles, was elected vice president at large. W. N. Davis of the Phillips Petroleum Co., Bartlesville, and president of the Mid-Continent Oil & Gas Association, was made vice president for production. W. M. Irish of the Atlantic Refining Co., Philadelphia, was made vice president for refining and Henry M. Dawes of the Pure Oil Co., Chicago, was reelected vice president and placed at the head of the marketing division.

W. R. Boyd, Jr., was reelected executive vice president in charge of the Institute's offices.

Each of the divisional vice presidents is to be ex-officio chairman of a divisional committee of 25 members active in that particular division. Five members of each committee will be appointed by the president from the board of directors and the remaining 20 will be selected by the membership of the division.

Separate divisional memberships will be open to Institute members at $5 each per year who are active in business. Associate memberships will be open to the government employees and teachers. General memberships in the Institute remain $10.

Local chapters or groups in each division may be formed and hold meetings. Mid-year general meetings of divisions may be arranged.

As a result of the new set-up the division of Development and Production Engineering and the Standardization division will be discontinued and their work merged with that of the producing division.

Amos L. Beaty, chairman of the Transcontinental Oil Co., New York, was reelected treasurer of the Institute and Lacey Walker was reelected secretary and assistant treasurer.

At its meeting to nominate directors the board of councillors recommended that the "at large" group be enlarged by five men and suggested that F. B. Parriot of the Transcontinental Oil Co., Tulsa; C. B. Ames of the Texas Co., New York; Wirt Franklin of the Wirt Franklin Petroleum Corp., Ardmore; Waite Phillips of the Independent Oil & Gas Co., Tulsa; and Jacob France of the Mid-Continent Petroleum Corp., Tulsa. The directors acted on the request of the councillors adding the five to the directorate.

New members of the board in the regular classification are W. T. Holliday of the Standard Oil Co. of Ohio, Henry C. Morris of the Dallas Gas Co., C. M. Fuller of the Richfield Oil Co., W. C. McDuffie of the Pacific Western Oil Co., W. M. Keck of the Superior Oil Co., Los Angeles, who was elected by the board to succeed the late David S. Ewing and Oscar Sutro of the Standard Oil Co. of California, who was elected to succeed H. M. Storey, resigned.

Those who retired from the board at the time of the meeting included E. L. Doheny who resigned, A. P. Coombe of Cleveland, N. C. McGowen of the Palmer Corp., Shreveport; J. F. O'Donohue of the Petroleum Producers Co., Wichita Falls; and Mark L. Requa.

Mr. Coombe and Mr. Storey are no longer actively engaged in our industry. Mr. McGowen was placed on the board previously in recognition of his place as head of the natural gas division of the American Gas Association which place now is held by Mr. Morris of the Dallas Gas Co. Similarly Mr. O'Donohue was placed on the board because of his position as head of the Texas division of the Mid-Continent Oil & Gas Association. E. T. Moore of the Sims Petroleum Co., now is head of that division and was placed on the board as director at large. Mr. Doheny reported in his resignation that he had been unable in the past to attend meetings of the directors and requested the election of a more active man.

The executive committee of the board for the coming year will consist of President Reeser, the four vice presidents, E. W. Clark of the Union Oil Co. of California, last retired president; and J. Howard Pew, R. C. Holmes, W. C. Teagle, Axtell J. Byles, F. A. Leovy and W. S. Fitzpatrick.

The membership committee will consist of Roy B. Jones, Panhandle Refining Co., Wichita Falls, chairman; Clark H. Kountz, Prairie Pipe Line Co., Independence, Kan., W. C. McDuffie and W. T. Holliday, newly elected board members, and Herbert L. Pratt of the Standard Oil Co. of New York.

Officers and Directors of the American Petroleum Institute for 1930

President
E. B. Reeser, Barnsdall Corp.
Vice President
L. P. St. Clair, Independent Oil Producers Agency
Vice President for Production
W. N. Davis, Phillips Petroleum Co.
Vice President for Refining
W. M. Irish, Atlantic Refining Co.
Vice President for Marketing
Henry M. Dawes, Pure Oil Co.
Executive Vice President
W. R. Boyd, Jr.
Treasurer
Amos L. Beaty, Transcontinental Oil Co.
Secretary and Assistant Treasurer
Lacey Walker

New Members of Board of Directors

PRODUCTION GROUP

Pacific Coast
W. C. McDuffie, Pacific Western Oil Co.
W. M. Keck, Superior Oil Co.
Oscar Sutro, Standard Oil Co. of California

DISTRIBUTION GROUP

Central U. S.
E. G. Seubert, Standard Oil Co. of Indiana
Eastern U. S.
W. T. Holliday, Standard Oil Co. of Ohio

NATURAL GAS GROUP

Henry C. Morris, Dallas Gas Co.

FOREIGN TRADE GROUP

Mexico & So. America
C. M. Fuller, Richfield Oil Co.

AT LARGE GROUP
E. T. Moore, Sims Petroleum Co.
H. B. Earhart, White Star Refining Co.
F. B. Parriot, Transcontinental Oil Co.
C. B. Ames, The Texas Co.
Wirt Franklin, Wirt Franklin Petroleum Corp.
Waite Phillips, Independent Oil & Gas Co.
Jacob France, Mid-Continent Petroleum Corp.

Re-elected Members of Board of Directors

PRODUCTION GROUP

Rocky Mountain
B. B. Brooks, Consolidated Royalty Oil Co.
Central U. S.
W. C. Franklin, Tidal Oil Co.
H. V. Foster, Foster Petroleum Corp.
Frank Phillips, Phillips Petroleum Co.
J. Edgar Pew, Sun Oil Co.
Eastern U. S.
O. D. Donnell, Ohio Oil Co.

MANUFACTURING GROUP

Pacific Coast
E. W. Clark, Union Oil Co. of California
Rocky Mountain
T. A. Dines, Midwest Refining Co.
Central U. S.
P. M. Miskell, Empire Oil & Refining Co.
John L. Gray, Shaffer Oil & Refining Co.
Eastern U. S.
Charles L. Suhr, The Pennzoil Co.

DISTRIBUTION GROUP

Rocky Mountain
E. T. Wilson, Continental Oil Co.

TRANSPORTATION GROUP (TANK CARS)

Lauren J. Drake, Union Tank Car Co.

NATURAL GASOLINE GROUP

Edgar J. Marston, Texas Pacific Coal & Oil Co.

FOREIGN TRADE GROUP

Far East
Herbert L. Pratt, Standard Oil Co. of New York

AT LARGE GROUP

J. F. Lucey, Lucey Petroleum Co.
E. W. Marland
Wallace E. Pratt, Humble Oil & Refining Co.
R. C. Holmes, The Texas Co.
Thomas A. O'Donnell, California Petroleum Corp.
William N. Davis, Phillips Petroleum Co.
E. B. Reeser, Barnsdall Corp.
H. F. Sinclair, Sinclair Consolidated Oil Corp.
F. A. Leovy, Gulf Oil Corp.
J. W. Van Dyke, Atlantic Refining Co.
Henry L. Doherty, Henry L. Doherty & Co.
W. S. Fitzpatrick, Prairie Oil & Gas Co.
W. M. Irish, Atlantic Refining Co.

Hold-Over Directors to Serve in 1930

PRODUCTION GROUP

Pacific Coast
L. P. St. Clair, Union Oil Co. of California
Central U. S.
W. S. Farish, Humble Oil & Refining Co.
Eastern U. S.
Axtell J. Byles, Tidewater Associated Oil Co.

MANUFACTURING GROUP

Pacific Coast
H. R. Gallagher, Shell Co. of California
Central U. S.
Roy B. Jones, Panhandle Refining Co.
Eastern U. S.
G. R. Nutty, Gulf Refining Co.
R. D. Benson
Frank B. Fretter, National Refining Co.

DISTRIBUTION GROUP

Pacific Coast
K. R. Kingsbury, Standard Oil Co. of California
Central U. S.
R. W. Stewart
L. L. Marcell, White Eagle Oil & Refining Co.
Eastern U. S.
Amos L. Beaty, Transcontinental Oil Co.

TRANSPORTATION GROUP

Ships
J. Howard Pew, Sun Oil Co.
Pipe Lines
C. H. Kountz, Prairie Pipe Line Co.

SUPPLY GROUP

J. S. Carroll, Johns-Manville, Inc.

FOREIGN TRADE GROUP

Europe
W. C. Teagle, Standard Oil Co. of New Jersey

AT LARGE GROUP

William F. Humphrey, Associated Oil Co.
S. A. Guiberson, Jr., Guiberson Oil Investment Co.
W. G. Skelly, Skelly Oil Co.
D. J. Moran, Continental Oil Co.
E. R. Brown, Magnolia Petroleum Co.
Henry M. Dawes, Pure Oil Co.
J. C. Van Eck, Shell Union Oil Corp.
Taylor Allderdice, National Tube Co.
George P. Whaley, Vacuum Oil Co.

Union to Spend $20,000,000 On Improvements in 1930

CLEVELAND, Dec. 9

THE Union Oil Co. of California will spend approximately $20,000,000 in 1930 in maintaining the growth of its various operations. This is about the sum that is being spent this year.

"Our capital expenditure for new development and increased facilities this year will be in the neighborhood of $20,000,000," said R. D. Matthews, vice-president of Union. "Our expectation is that our program for next year will reduce our expenditures for new drilling which probably will be offset by expenditures for additional facilities in other directions of our business, necessitating approximately the same capital outlay for 1930 as during the current year."

"Inasmuch as our normal rebuilding and new construction plans for the coming year were not reduced after the recent stock market disturbance, we have no reason to reconsider them in light of the Hoover program to which you refer," said W. M. Irish, president of Atlantic Refining Co., in answer to a query about what the company might do in regard to a 1930 building program.

"Stated in another way," Mr. Irish continued, "we feel that we are conforming to and supporting the President's program by carrying forward our plans and operations in the usual and regular manner."

The outlook of the oil industry in 1930 is encouraging, in the opinion of W. L. Stewart, president of the Union Oil Co.

"This conclusion," said Mr. Stewart, "is enforced by the demonstrated willingness of producers to curtail crude production in keeping with demands for crude oil products.

"This forecast will be particularly true if the refiners manifest the same disposition to limit crude runs to current production. If refiners continue to run at maximum capacity and beyond current crude production, the benefits of curtailed crude production will be lost.

"It is doubtful if increase in gasoline demand for 1930 will continue at the normal rate of previous years unless business activity is increased. Any retardation in trade will not be serious if crude production and refinery runs are regulated to balance demand for products. The outlet for other major products will keep pace with gasoline consumption.

"I do believe the leading oil stocks are selling under real intrinsic worth and look for considerable enhancement in values as the industry demonstrates its ability to control its producing and refining operations. This company's shares, like those of other companies, have fluctuated from time to time because of outside forces, but I do not think that the upward trend during the early part of this year was unreasonable. Generally speaking, I know of no good oil stock, and by this I mean the stock of major integrated companies, that has sold above its intrinsic value during the year."

Our Industry to Work Consistently To Stimulate Employment

By A. E. Heiss
N. P. N. STAFF WRITER

WASHINGTON, Dec. 9

THE oil industry will do everything consistent with good business practice to stimulate building and minimize unemployment in 1930, J. F. Lucey, president of the Lucey Petroleum Co. and special emissary from the American Petroleum Institute meeting at Chicago, indicated to the National Business Survey conference here Dec. 5.

Mr. Lucey, who presented to the conference the resolution adopted by the institute's directors at Chicago, indicated that our industry could not be expected to drill more wells than it drilled in 1929, nor could it be expected to expand refining facilities in view of recent overproduction of crude oil and refined goods, but it could proceed with fundamental and practical research and continue its normal program of modernization which alone entails the expenditure of tens of millions of dollars.

On presenting the resolution, Mr. Lucey said:

"That is the official resolution passed by the directors of the American Petroleum Institute. I might comment upon that personally but my comments would not be my own views but would reflect the views of producers, whether small Independent producers or representatives of the major companies. And I might answer a few of the questions that were asked.

"You asked for the strong and the weak spots.

The Strong Position

"We consider the strong position that we have been able by voluntary agreement to bring about a balance of production with market requirements in the production of crude oil. That has been the task that we have been working on for a great many years, and we feel very much gratified that we have now been able to bring about that condition.

"You ask how the condition of our business is as compared with a year ago.

"The oil industry today is in better condition than it was a year ago, in better condition than it was three years ago, in better condition than it was six months ago, and better than it was 90 days ago.

"The weak point is, as I said before, the overproduction of gasoline.

"In the October report of the United States Bureau of Mines they call attention to this fact. And if that condition were permitted to continue it would threaten the stability and the prosperity of the industry. And the industry is now in a very prosperous condition.

"That is the problem we are now facing, and we are yet undetermined as to how we are going to solve it.

The Industry Carries On

"Several of the gentlemen here today have made reference to research and refinement in manufacture, and so forth. We have been carrying out in the oil industry a very extensive program along that line. In the research field alone, fundamental research, which is entirely separate from that of practical research, we are working on a $500,000 appropriation (the Rockefeller and Universal Oil Products Co. fund).

"This may be a good time for us to finally conclude our standardization program which we have been working on for many years. And by virtue of those standard products of oil equipment and oil company goods generally we have established a standard for the entire world.

"I am authorized by the directors of the American Petroleum Institute to say to the chairman of this board and to the administration generally that we have absolute confidence in their leadership and that the industry is prepared to carry out any program of cooperation that is decided upon at this meeting.

Survey of Construction Recommended

"I shall recommend tonight, and I am sure the institute will carry it forward, that we make an immediate survey of plant construction improvements.

"I might add that the industry expects to spend this year just as much money as it has every other year. But there is no occasion for our drilling more wells than we did, for instance, in 1928 and 1929. In 1928 we drilled in the United States over 22,000 wells. Many of them were not productive. Those will cost all the way from $4000 per well in Pennsylvania to $90,000 in the California field. A fair average would be from $20,000 to $25,000 per well, or a total in excess of over $500,000,000.

"That is only the beginning. That has nothing to do with our pipe lines, our field gathering lines, our erection of new tanks, improvements in refineries and general distribution.

"Nor could we add to refineries. We have too many already but we can improve these refineries. This will be a good year to install new plants, new stills. And we can improve along many other lines. And I am sure that the institute will be glad to cooperate with this organization in carrying out that kind of a program."

1930 Will Be Normal Year

Assurances, ample and hearty, by men competent to give them, that 1930 will be a normal business year, were given President Hoover by the conference, as answer to his suggestion that American industrial leaders survey the field and see to it that nothing be left undone to prevent unemployment and that consumption be kept at a normal level, which is necessarily a high one in the United States, to the end that the country suffer nothing untoward by reason of the slump in the stock market.

Four hundred business leaders, representatives, many of them of business associations, gathered in the conference, at the suggestion of President Hoover. The conference was called by the Chamber of Commerce of the United States.

Twenty billions of dollars will be expended, for capital purposes, in the coming year. There is some dispute as to whether that is a normal sum or in excess of it. No one contends that it is less.

Whether it is normal or above normal is not of much meaning. Either normal or above normal means that President Hoover's move to prevent fear on account of the stock market collapse spreading havoc through the business world, has been a success. What he is desirous of preventing is hesitation in productive enterprise, even for the natural curiosity purpose of finding out whether somebody else is hesitating or thinking of hesitating.

While the 400 representatives of finance, industry, merchandising and

transportation were in conference, three bills were introduced in Congress increasing to $125,000,000 a year, the amount of the contribution of the national government to the construction of new highways. The increased sum is to be granted for each of the next three years. At present the federal government is contributing $75,000,000 a year.

Building to Be Stimulated

One of President Hoover's ideas is that there has not been enough building, taking the country as a whole, because of the high cost of money caused by the demand for stock market speculation. In some places, Washington for instance, over-building has been in evidence for a long time but in other places evidence of under construction, it is asserted, is equally obvious. Construction of buildings, according to the President's view, is an extremely desirable method of preventing unemployment because it consumes rather than produces goods.

One of the unconfirmed reports about the conference was that "retrenchment" was found on the banners of only three concerns, one a trunk line railroad, one a steel mill and one the national organization of a big industry. The report is that each of the three changed its mind about the desirability of reducing wages or working force.

The White House view of the purpose of the conference was to have a temporary organization created, for each industry, the chief duty of which should be to expand construction and maintenance. The conference was in the nature of a review as to things that had been done and what, if anything in addition, could be done.

Industries in Good Shape

Broadly speaking every industry was reported to be in very good shape, even the automobile industry. Taken generally, said Alvan Macauley, president of the National Automobile Chamber of Commerce, the industry is in a most wholesome and healthful condition; inventories are not excessive and the industry is assured of operation to 75 per cent of its capacity on replacements and foreign demand, the latter not being affected by the stock market plunge.

Secretary Lamont of the Department of Commerce said that the shift in credit caused by the stock market plunge had been accomplished without strain.

R. H. Aishton, president of the American Railway Association, said members had budgets for extensions and improvements in the coming year amounting to $1,020,000,000, in comparison with $800,000,000 this year. His thought was that the money would be spent on account of the lower interest rates that have prevailed since stock market broker demands were not so high.

Standard Truck Dimensions Proposed by Oil Men

CHICAGO, Dec. 6

SUGGESTED standard dimensions for truck chassis, drawn up by a sub-committee of the Pacific group of the American Petroleum Institute committee on automotive transportation, will be submitted to the transportation committee of the Society of Automotive Engineers by Pierre Schon, a member of the S.A.E. committee and a special representative of the General Motors Truck Co.

Mr. Schon said the work of the Pacific group committee was the most intelligent study of truck standardization he had ever seen and also announced that similar work had been done by General Motors who had reduced to eight the number of chassis sizes required for the entire range of motor truck hauling.

Dr. R. P. Anderson, technologist of the institute, who was chairman of the automotive transportation committee meeting, said that as the recommendations of the Pacific coast men were tentative, and as the study of chassis standardization was being carried on by other groups, the suggested dimensions would not be published at this time although members of the committee were supplied with copies of the report.

General Motors' standardized chasses were as follows, Mr. Schon said:

Total Length of Body Feet	Distance Between Rear of Cab and Center Line of Rear Axle Inches
6	39
7½	48
9	59
10½	70
12	82
15	99
18	115
21	135

The Pacific coast group suggested load space lengths of 4 to 11 feet with the exception of one 4½-foot space for light jobs.

Because there is no standardization of chasses, tanks often cannot be transferred from one chassis to another. Rear wheel housings may not fit and sills may be too wide or too narrow, it was said.

Wheelbase means little in the dimensions of a truck, it developed in the committee meeting, the chief dimension involved in standardization being the distance from the rear of the cab to the center of the rear axle, or in the case of six-wheel trucks, from the rear of the cab to a point midway between the two rear axles. These spaces are known as the load spaces and must be longer than the overhang beyond the rear axle.

The Pacific coast committee recommended a frame width of 34 inches for jobs of gross weights, including payload, up to 8000 pounds and 38 or 40-inch widths for heavier jobs. Mr. Schon said that 34 inches was the standard width suggested by his company because that width would permit the use of 9.75-inch dual rear wheels and still keep the tread of the vehicle to the limit of 96 inches set by many states.

Mr. Schon said it was desirable to get as low a frame as possible but in commenting on the suggestion of the Pacific coast group that the slope of the frame when unloaded should be as near zero as possible, he said a frame level when unloaded would sag about three inches when loaded.

Frank Jones, Shell Petroleum Co., told of a tank explosion which blew out the side of a garage and seriously injured one man in Indianapolis. The shell of the tank has been ruptured and the truck has been put into the garage for welding. The tank had been steamed for many hours, he said, and water had been run through all compartments for 12 hours. The weld was almost completed when the explosion occurred.

J. F. Winchester, the Standard Oil Co. of New Jersey's automotive transport director, said the explosion had evidently resulted from flammable vapors that had been trapped between the bulkheads of the tank. He suggested that the spaces between the bulkheads of compartments be provided with means for flushing.

A proposal for a uniform method of accounting for automotive transportation was referred to the committee on uniform methods of accounting of the institute.

PAPERS on the application of semi-trailers to oil transportation by A. W. Kenerson, Standard Oil Co. of Ohio, and the use of six-wheel trucks by C. A. Pierce, Diamond T Motor Car Co., Chicago, which were presented before the A.P.I. group meeting on automotive transportation, will be published in the Dec. 18 issue of NATIONAL PETROLEUM NEWS.

Educate Dealers on Products Sold, Indiana Jobbers Are Told

INDIANAPOLIS, Dec. 6

GET your dealers "out of the rocking chair" and to merchandising by giving them information on the products they sell, members of the Indiana Petroleum Association in convention here Dec. 5 and 6 were told by G. French, of the domestic lubricating department of the Sinclair Refining Co.

The secret of the Independent staying in business is his ability to get customers into his stations, Mr. French said. The jobber must obtain more information about the goods from his source of supply. Many jobbers do not know what to say when giving a customer a sales talk, he said. The jobber in turn must pass on this information to his dealers so they can do an intelligent job of merchandising.

In the election of officers for 1930 Herbert Davis, Service Oil & Gas Co., Sullivan, was selected for president; T. J. O'Day, O'Day Oil Co., Fort Wayne, for vice-president; and H. R. Orbaugh, Elwood Oil Co., Elwood, for treasurer. Mr. Davis was vice-president this year.

The convention opened Dec. 5 with a luncheon, L. O. Chasey, secretary to the governor, giving the address of welcome. H. H. Johnson, Supreme Oil & Refining Co., Indianapolis, and president of the association, responded. Max L. Wickersham, executive secretary of the association, explained plans of the association and the new policy of placing memberships on a three-year basis.

Addresses on the first afternoon program were by W. H. Arnett, man aging director, Indiana State Chamber of Commerce, "Association and Freight Rates"; T. M. Overly, managing director Indianapolis Better Business Bureau, "Ethics in Business"; Capt. H. Weir Cook, Curtiss-Wright flying service, on "Aviation and Its Development"; Mr. Schuch, Stevens Oil & Grease Co., on "Grease, Sale and Manufacture"; Paul Deer, of Geo. W. Deer & Co., Crawfordsville, on "Farm Credits"; F. J. Wees, Indiana manager, Tide Water Oil Sales Corp., "The Value of Trained Service Station Salesman"; and Mr. Davis, on "Oil Company Management."

The code of ethics was discussed in the morning session, Dec. 6. Gen. H. C. Smither, assistant to the president of the Indian Refining Co., spoke on need of a code in business. The discussion on interpretations was led by H. L. Rauch, division manager of the Indian Refining Co., and chairman of the Indiana code committee.

Sam Hurd, former secretary of the association, is devoting all his time now to sponsoring the code. He explained that his committee hoped to have regional meetings frequently throughout the state. In each region, meetings would be in sets of two, about two weeks apart, so questions brought up at the first meeting could be settled at the second gathering.

Program of the second afternoon session was addresses by Phillip Zoercher, member of the Indiana state tax board, on the proposed constitutional convention in Indiana; S. S. Yoeman, certified public accountant, on "Oil Company Accounting"; G. French, on "Work"; and Morris G. Young, on progress of the Indiana Petroleum Marketer, association house organ. There was a closed session for members.

F. C. Packard, tax attorney, Standard Oil Co. of Indiana, was the speaker at the banquet on the final evening. Mr. Packard reviewed the mounting cost of all forms of government, saying that he believed indirect taxation in the middle west soon would equal in amount direct taxation levies.

Carbon Black Export Association Formed

CLEVELAND, Dec. 9.—Companies that represent more than 92 per cent of the carbon black output of the world, it is said, have organized the Carbon Black Export Association, Inc., under the Webb-Pomerene law. The export association will promote foreign markets for American carbon black.

Participating in the export association are Binney & Smith Co., representing Columbian Carbon Co., Coltexo Corp., Keystone Carbon Co. and Texas-Louisiana Carbon Black Co.; United Carbon Co., including its subsidiaries, Kosmos Carbon Co., Eastern Carbon Black Co., and Crystal Carbon Co.; Godfrey L. Cabot, Inc., including Texas Elf Carbon Co., Cabot Co., Cabot Carbon Co., and Gas Products Co.; J. M. Huber, Inc., including J. M. Huber Co. of Louisiana, Inc., Ebony Carbon Co., Weston Carbon Co. and J. M. Huber Pigment Co.; the Palmer Gas Products Corp., representing the associated carbon black interests of the Palmer Corp. and Electric Bond & Share Co., and R. W. Greeff & Co., Inc., representing Texas Carbon Industries, Inc.

The officers of the association will be Norman Lee Smith of Binney & Smith Co., president; Edmund Billings of Godfrey L. Cabot, Inc., vice president; R. H. de Greeff of R. W. Greeff & Co., secretary; G. A. Williams of United Carbon Co., treasurer, and H. W. Huber of J. M. Huber Co., assistant treasurer. Together with John W. Herron of Palmer Gas Products Corp., they will constitute the board of directors.

Carbon black exports have been growing rapidly in recent years, reaching a total, according to the U. S. Bureau of Mines, of about 78,000,000 pounds in 1928, valued at nearly $7,000,000. Exports for 1929 are estimated to exceed 100,000,000 pounds. Among the principal foreign purchasers are Canada, England, France and other European countries, but distribution is actually world wide; some carbon black is even shipped 1200 miles on camel-back into the interior of China for the manufacture of Chinese stick ink.

Cleveland Oil Lawyer Joins New Firm

CLEVELAND, Dec. 7.—The law firm of Chamberlin, Marty & Fuller, counsel in Ohio for a number of Independent oil companies, has been combined with the firm of Cull, Burton & Laughlin and will be known as Cull, Fuller & Laughlin.

The consolidation of the two firms follows the recent death of George B. Marty, and the death more than a year and a half ago of Judge C. D. Chamberlin, who for years was secretary and general counsel of the National Petroleum Association.

Chamberlin, Marty & Fuller, of which "Judge" Chamberlin was senior member, specialized in that branch of corporation law that pertained to the oil industry. Mr. Fuller has specialized in oil industry work and at present is counsel of the Ohio Petroleum Marketers Association and represents several large Independent oil companies in Ohio. Dan B. Cull, senior member of the new firm for many years was a judge of the court of common pleas in Cleveland. The new firm has offices at 1044 Hanna Bldg., Cleveland.

Tennessee Considers Tax On Lubricating Oil

(By Telegraph)

NASHVILLE, Tenn., Dec. 10.—A tax of 5 cents a quart on all lubricating oil is being considered by the Tennessee legislature. Bills sponsoring this tax were introduced into the senate and the house on Dec. 5, and have passed second reading now.

Ultimate passage of the measure seems inevitable, according to Lew W. Collins, secretary of the Tennessee Oil Men's Association.

Review of Late Production News

DAILY average crude production in the country fell off 7650 barrels the week ended Dec. 7, to 2,630,550 barrels, according to the American Petroleum Institute.

Crude oil imports were nearly 96,000 barrels higher daily than during the week ended Nov. 30. They reached 277,571 barrels daily average the past week, bringing new crude supply to 2,908,121 barrels the week ended Dec. 7, as compared with 2,819,914 barrels the previous week.

Oklahoma's total daily average output was 655,100 barrels the past week, a gain of 6200 barrels. Oklahoma City pool recorded the largest change, with a gain of 16,850 barrels in daily average output. Earlsboro fell off 6800 barrels, Sasakwa 2850 barrels and Bowlegs 2050 barrels.

Santa Fe Springs in California increased 7500 barrels. Elwood-Goleta field declined 5000 barrels.

Winkler county in West Texas fell off 3650 barrels and Pecos 2250 barrels.

Salt Creek declined 4100 barrels on daily average.

California

DAILY average production in California for the week ended Dec. 7 was estimated to be 697,150 barrels, or a decrease of 5700 barrels from the daily average of the previous week.

Although California operators are confident that the overproduction problem is being solved satisfactorily, Santa Fe Springs continues to be a disturbing element. The situation there is complicated by the fact that a few companies are not "playing ball." These are not abiding by the umpire's recommendations, with the result that the daily average production for the field for the first six days of December was nearly 20,000 barrels over the allowed output.

Luton Bell No. 10 at Elwood came in on Dec. 7 for about 3000 barrels initial. Scheduled completions of Mahoney No. 1 and Elwood Exploration No. 1 are expected to run production of this field up to 35,000 daily average.

According to estimates prepared by field engineers, 35 wells will be completed at Santa Fe Springs during the first two-week period in December, and nearly double that number are scheduled to be completed in the four week period ending January 15. Many of these wells are expected to be large producers.

Concerted action by operators in the Ventura Avenue field has resulted in the shutting in of a number of wells and a notable reduction of the oil-to-gas ratio of the field.

Consideration for the welfare of oilfield workers is a factor in the conservation program. Company executives are seeking some way to avoid the discharge of field men when drilling operations are curtailed. In some instances, the companies have adopted a five-day week.

Current production in this country by pools is found on page 121.

Although rich oil sand is reported in Oscar Howard's Hathaway No. 7 at Santa Fe Springs, work on it has been suspended through fear that if it became the world's deepest commercial producer it would start another drilling campaign that might wreck conservation plans.

Oklahoma-Kansas

THE outstanding well of a quiet week in Oklahoma was a 500 barrel wildcat strike in Noble county. Production is coming from the Misener sand, which is not considered long lived enough to make the find of more than passing importance.

A wildcat in northern Sumner county, Kansas, is also lightly regarded because of the formation from which it is producing. It is estimated as good for from 500 to 1000 barrels per day from the chat, a notoriously unreliable pay.

The feature of the Texas Panhandle was a quarter mile extension of the Finley pool, Gray county. The new well had an initial production of some 4700 barrels per day. The extension was in northeast direction.

Texas, New Mexico, Louisiana

TWO miles northwest of the Continental Oil Co.'s. No. 1 Lockhart well, in southeastern Lea county, New Mexico, that company found a show of oil in lime formation at 3878-3901 feet in its No. 1 A. E. Meyers test, 17-21S-36E. The well was then shut down awaiting production test.

In northern Glasscock county, West Texas, beyond production in the area under development by the Shell, Lion and Kirby companies, the No. 1 Edwards test of Glasscock and others, swabbed at the rate of 25 barrels an hour at total depth of 2288 feet. The well is in sec. 18, township 2 south, Texas & Pacific block 33.

Louisiana developments were of local interest only.

Wyoming, Montana

MATERIAL extensions have been made in the producing area of the Pondera field, northern Montana. Interest in the state, however, continues to be chiefly centered in the work being done in the new Red Coulee-Buckley Dome area lying partly in Montana and partly in Alberta; a completion will be made in this field soon.

Midwest Refining Co.'s deep test to the granite in the Salt Creek field has encountered a production of about 5000 barrels in the third Sundance sand; the well will be shut off and continued to deeper sands.

No date of spudding has been given out by the Midwest Refining Co. for the well it will drill on the Midway-Geary dome structure, lying between the Salt Creek and the Big Muddy fields, central Wyoming. The work is to be done for the account of the Saltmount Oil Co. It is to be a deep test.

Denmark imported a large share of its petroleum products from the United States during the first six months of 1929. This country shipped nearly 400,000 barrels of gasoline, 235,000 barrels of kerosene, 60,000 barrels of lubricating oils and 75,000 barrels of fuel oil to Denmark in that period.

Great Britain was second in gasoline shipments, shipping 320,000 barrels. It was also second in kerosene exports, which amounted to 55,000 barrels.

El Dorado Field Chapter of A.P.I. Hears Talk on Oil Treating

By John Power
N. P. N. STAFF WRITER

EL DORADO, Dec. 6

THE earlier after its formation that oil field emulsion can be treated the more effective will be the treatment. And following naturally is the fact that the more effective the treatment of emulsion the less the expense.

It was this point which was stressed by H. C. Van Houten, emulsion treating engineer for the Empire Oil & Refining Co. when he made the principal talk at the December meeting of the El Dorado field chapter of the American Petroleum Institute Division of Development and Production Engineering, held at Oil Hill the night of Dec. 3.

For economy and effectiveness Mr. Van Houten said that he believed in treating the emulsion at the well, or in the lead line rather than by running it through a central treating plant. The higher the temperature at which the emulsion is treated the better will be the results, and as oil is generally produced at temperatures higher than atmospheric, it is good practice to take advantage of the heat provided by nature. This is particularly true in the winter months.

There are, he said, several ways of treating the emulsion at the well. One is to introduce the chemical down the hole and let it be returned with the oil. This method, he said, has been found satisfactory in many fields, and on many wells, although the oil well's individuality continues to be felt in the oil it produces. Just as all wells can not be handled alike, all emulsion can not be treated alike.

There are two methods for introducing the chemical into the hole which may be followed. One is to introduce it in batches at intervals. The other is to keep a small, steady supply going down the hole at all times from a reservoir whose outlet can be regulated.

Mr. Van Houten described the familiar types of these reservoirs, and said that in his opinion treatment in either the well or the lead line was preferable to treating the oil later on in its travels, as this method kept the gun barrels and stock tanks freer of sediment, and meant less grief in the long run.

There must be an emulsifying agent in the oil, plus agitation, to form emulsion, he said. This agent in the El Dorado field is asphalt, he said. The agitation can be supplied by any one of a number of sources. The back pressure of a column of fluid inside of the tubing against a leaky valve seat is a frequent cause of emulsion. In areas where repressuring is under way excessive by-passing of gas or air to any particular well will cause that well's production to contain emulsion. This is particularly true of such wells which are making some water along with the oil.

The presence of water often causes oil to emulsify although experience has shown, said Mr. Van Houten, that there is a critical water/oil ratio which will produce a maximum amount of emulsion. Sudden drops in pressure, as flow lines swaged up to a larger size, or the same effect when oil is passed through choke nipples often is a prolific cause of emulsion.

The treating of emulsion has long been one of the oil industry's major problems. One of the first methods tried in treating emulsion was that of steaming. Although fairly successful as a treatment, the steaming method proved expensive. The crude lost gravity when steamed to allow the emulsion to settle, and there was a volume loss as well due to excessive evaporation.

As an improvement on the steaming method the lime treatment was tried said Mr. Van Houten. This, however, merely settled out the emulsion without recovering any of the crude it contained. The electrical dehydration of the emulsion then came into use, a method which is still in use on occasional emulsions.

The process of dehydration is accomplished by sending two currents of electricity of high voltage and low amperage through the crude. This ruptures the film of oil which surrounds the drops of water, and permits the oil and water to separate. The method is more successful on the heavier oils with a goodly percentage of water than on any other.

Various methods have been tried, all of them leading to the chemical method, which has come into general use. Some combinations of mechanical and chemical methods have been found satisfactory, where the mechanical work on the emulsion is designed to make easier the action of the chemical.

Only by experiment, said Mr. Van Houten, can the proper chemical for treating any particular emulsion be determined. To make the tests a number of one per cent solutions of the various chemicals considered as likely are put into 4-ounce bottles. The bottles are then filled up with emulsion and the results carefully noted. Only a very small amount of chemical is used, as too much would have a too thorough effect on the small portion of emulsion used in the test, and the results of the different chemicals would be too difficult to tabulate accurately.

The time element is important in the selection of the chemical. Some of them, said Mr. Van Houten, work rapidly, and lose their effectiveness, while others work slower, but over a longer period of time. The chemical to be selected depends on the time and place of introduction into the crude.

Wells with back pressure being carried on them presented no particular problem in getting the chemical down the hole against the pressure, he said. A lubricator made from a section of 10-inch casing with the ends welded closed and valves installed could be connected to the casing head. When the gas from the well had built up sufficient pressure in the reservoir to equalize the pressure in the hole the chemical would then travel down without any hindrance.

In treating emulsion, said Mr. Van Houten, one of the most important things to watch, particularly on the part of the field man operating the property, was to see that no more chemical than was absolutely necessary be used.

It is generally true that a relatively small amount of chemical will do the work to its economic limit and any more chemical than this amount used represented pure waste. Chemicals are expensive, and to a company with production covering many fields the waste of a gallon or so per day on very many leases would amount to a considerable sum of money over a period of time.

(By Telegraph)

TULSA, Dec. 10.—Operators in the Voshell pool of McPherson County, Kansas, met in Tulsa this morning and agreed to extend proration to February 15. Wells will be held to 50 barrels daily until that date. A meeting will be held in Wichita, January 10 to decide on action when the proration period ends.

New Zealand imported 63,000 barrels of kerosene from the United States in the first half of 1929; 45,000 barrels of lube oils; and nearly 800,000 pounds of lubricating greases, out of its total imports of 915,000 pounds. These products constituted about 80 per cent of New Zealand's total imports.

"Cooperative Oil Field Development Is Inevitable"—Deterding

By Lawrence E. Smith
N. P. N. STAFF WRITER

CHICAGO, Dec. 5

"COOPERATIVE development of some character is necessary —it is inevitable," Sir Henri Deterding, managing director of the Royal Dutch-Shell Companies told a representative of NATIONAL PETROLEUM NEWS on Thursday.

In a half-hour's discussion, which touched upon many subjects, this international figure in petroleum, whose rise from an obscure merchandising position to a place of primary importance in the world oil arena, developed some of the points which he had stated more generally in his prepared address to the American Petroleum Institute two days earlier.

It is usual that a man of this stature is invested by the industry in which he moves with an aura of mystery. In the case of Sir Henri, the mystery—the icy remoteness—is fancied and not real. He is as thorough a democrat as, say, Walter C. Teagle. He had just finished his breakfast when this writer was admitted to his rooms and he appeared to be much at peace with life.

He is not austere; he is almost jolly. He turns a witticism frequently to emphasize some assertion and he replies to queries with an air of complete frankness. What appears in his addresses as an unfamiliarity with the English tongue is a matter of accent only and not of understanding of the words. One has no difficulty at close range of following perfectly his remarks.

"Sir Henri," said the interviewer, "in this country our industry is engaged in two movements, both calculated to achieve the same result. One is the curtailment of production, now extended to every important flush field of the United States. The other is cooperative development of fields. You, through your American companies, have aided in the development of the program but have made but little comment on the methods employed. Are you in entire agreement with the programs that have been developed?

"Let us first use the word 'conservation' rather than 'curtailment'," said Sir Henri. "Curtailment implies a loss. Conservation is the delay in the sale of a commodity at less than its worth and less than its cost. I am 100 per cent in favor of the work that is being done in the producing fields of the United States.

"My admiration for the American Petroleum Institute is great. It is an association that should be a model for other industry. I expect to see it become more important and in time the oil industry will defer in most matters to the judgment of the president and the directors, who represent the entire industry.

"The program of conservation in the United States is being carried out by persuasion and not by the making of laws, which is as it should be. The industry is showing that it can govern itself and it will grow in this ability with practice.

"Further correction in other lines of the oil business is necessary. Some of the public may think that cheap petroleum products are desirable. Now, I am not predicting a shortage of petroleum, but what do we know about our problems ten years ahead. You may take any three fields that have been developed in the United States—any three—and you will find them typical of all. They have had a height of production for a short time, perhaps a single day, then they have gone—," he finished with a darting, downward movement of his hand.

"It is not good business to sell some of our products as cheaply as they are being sold. Fuel oil has displaced coal. Now it is being sold in California for 40 cents. That is wrong both from the standpoint of profits and as a measure of increasing consumption—disposing of surplus.

"It doesn't matter any more whether it is 40, 50, 60 or 70 cents. It has already filled its market—it will displace but little more coal. And the latter should not occur. Coal has its uses and they should be preserved, keeping our oil for those purposes which cannot be fulfilled in any other way."

Sir Henri was here reminded that the constant building program of the natural gas companies, bringing gas to centers of population remote from the fields, is tending to restrict the use of fuel oil.

"That," he said, "is as it should be. Encourage your oil industry to continue to buy the output of your steel mills, but it is much better now to place the pipe horizontally than to place it vertically in the ground. Use more of it in gas lines and less of it in casing wells."

"Sir Henri," said the interviewer, "there is one statement in your address that might be ampified. You said '. . . let us always realize that production in a country is going to be sold in that country, whatever the price may be, and that logical government protection against cheap dumped imports is a certain event.' Do you include the United States in this assertion?"

"The United States and all other countries that produce oil," he said. "Suppose the United States produced 60 per cent of its consumption and that Mexico produced 20 times its own requirements—that it cost $2.00 per barrel to produce oil in the United States and 50 cents in Mexico. Would the government permit its domestic industry to be slain by the dumped imports. It would not do so in any industry. It would collect into its treasury enough money from the producers in Mexico, per barrel, to take away their advantage. It is natural that it should be done."

"Then, with the United States and Europe the chief consuming areas of the world, and with enlightened governments in those areas, such a political brake will operate to retard speedy development of South American fields, will it not?"

"Assuredly it will," said the head of the Royal Dutch-Shell interests. "If the United States oil industry should be faced with ruin because of South American oil, or oil from anywhere else, it would be natural for your government to exercise its method of protection.

"I am happy whenever I come to this country," said Sir Henri, as the interviewer rose to go. "I enjoy the association with the splendid, resourceful men who make up the American Petroleum Institute. My contact with them never fails to add to my own enlightenment and to enable me to see the petroleum industry as an international whole. Our problems are much the same the world over and no matter where we operate, the same basic solutions apply."

American Petroleum Institute . . . Chicago, Dec. 3-5, '29

Progress Made in Solving Corrosion, Gum, Anti-Knock, Volatility Problems

By Arch L. Foster
N. P. N. STAFF WRITER

CHICAGO, Dec. 5

REMARKABLE strides in the solution of vexing refinery problems relating to cracking, gum formation, dewaxing of lubricating distillates, corrosion of refinery equipment, and volatility and detonation characteristics of motor fuels have been made during 1929. The presentation and discussion of the results attained by different investigators made this year's meeting of the refinery technology division of the American Petroleum Institute probably the most interesting and instructive in the history of that body.

It has been determined that the gas and distillates from vapor phase cracking show very little essential difference in properties even when produced from widely different stock. However, opinions as to the optimum conditions for the production of high anti-knock motor fuels are still far from unanimous. The use of radiant heat in stills has been happily converted from a bugbear to a boon to the harassed refiner in his ceaseless fight to reduce costs and lower equipment depreciation.

Gum formation in gasoline looms larger and larger on the refiners' trouble horizon as strenuous efforts to increase the anti-detonation value of fuels by improved cracking and treating methods continue. Promising results have been obtained in the study of gum inhibitors and further progress may reasonably be expected within the next year.

More light is shed on the mechanism of gum formation, which, if further studied, should aid in providing a weapon for combating this evil. The relationship which appears to exist between anti-knock properties and gum forming tendencies further complicates the problem of retaining anti-knock value without increasing gum content beyond permissible limits.

In spite of the rapid improvement in the art of dewaxing lubricating distillates and bright stocks, it appears from data presented that the pour point of lubes is not entirely a function of the wax content. Filter versus centrifuge continue their race to see which will be of most service in obliterating undesirable wax from crankcase and cylinder.

At least a few of the teeth of corrosion have been blunted or pulled, as indicated by favorable results reported in the use of different methods of attacking the problem. These methods are resolved into three major groups, chemical neutralizers, resistant metals and alloys, and protective paints and coatings, each type effective in its own sphere, none universally applicable. Aluminum has shown its worth under certain conditions, as well as cement linings for stills or reaction chambers; for reducing corrosion by charging stocks, especially in cracking, neutralizers such as ammonia, caustic and lime have proved of excellent value.

Efforts to measure the detonation value of motor fuels have resulted in the design of a test engine, and the development of a standard method is being actively pushed. A satisfactory solution of this problem may be looked for within a year or two, it is believed.

Fairly definite relationships between A.S.T.M. distillation data and vapor lock and starting tendencies have been arrived at this year. Drs. Bridgeman, Brown, Brooks and Bruce have been very active in working out this problem, along with several others whose contributions to available data are of great practical value.

Must Sacrifice Viscosity to Get Low Pour Point

Complete dewaxing of bright or long residuum stocks does not entirely control the pour point of the finished oils according to investigations reported by Max B. Miller at one meeting of the technologists. As a matter of fact viscosity of the oil has a direct relationship to the pour point of a wax free oil.

Mr. Miller reported experiments with a number of oils which varied in pour point from 10 F. to minus 10 F. which were chilled down to 35 degrees below zero without showing any cloud to indicate the presence of wax. With no cloud at that point he concluded that the oil was wax free.

By chilling the oils down to very low temperatures it was found that the pour point could be lowered below the range indicated before. But this was found to be done by precipitating out heavy portions of the oil. This resulted in a lowering of the viscosity of the oil.

The suggestion was made that if viscosity is to be sacrificed for low pour point that the place to reduce the viscosity is in the still rather than by chilling to extremely low temperatures.

Effects on yields of precipitating out the heavy ends of the oils were reported to be quite marked. To produce a Pennsylvania oil of zero pour point Mr. Miller said that it was necessary to settle out about 30 per cent of the stock. This statement was contested by one of the refiners of that type of crude.

A report was made of results of operations at the Ponca City plant of the Continental Oil Co. in recent months in the production of low pour point oils. In order to obtain a bright stock with a solid point just under zero it was found necessary there to centrifuge at 40 to 45 below zero. To produce an oil of higher pour point the temperature differential could be lessened.

In the course of the discussion of the paper on dewaxing lubricating oils by Dr. E. R. Lederer and R. Beattie of the Texas Pacific Coal & Oil Co., E. W. Zublin, chief chemist, who presented the paper, reported a few experiments with solvents other than naphtha. His experience with chloride solvents was that traces of chlorine were found in the residuum and that the oils lose color badly. Discussion developed that the acetate solvents give good results in crystalizing out wax.

Thermo-dynamics in Oil Refining

The lack of dependable physical and chemical data regarding petro-

leum hydrocarbons by means of which predictions on the course of chemical reaction may be made, based on thermo-dynamic calculations, was stressed by Dr. A. W. Francis, of A. D. Little, Inc. Dr. Francis presented the results of his study of the possibilities and limitations of the application of thermo-dynamic methods prediction of reactions of organic compounds.

The author showed how equations which have been derived prove that the free energies of formation of many alcohols, hydrocarbons, etc., are simple functions of temperature. In deriving these equations use was made of the third law of thermo-dynamics and data on vapor pressure, specific heats, heats of fusion, vaporization and reaction, and chemical equilibria.

By combination of these free energy equations predictions may be made of the possibility of and the proper conditions for proposed reactions. The author showed graphs plotted by means of the equations which will facilitate simple predictions by inspection of the plots. The scarcity of data for continuing and perfecting such studies is the chief obstacle to progress in this work, according to the author. He predicted that sooner or later the "cut and try" methods now in vogue in petroleum chemistry will be replaced by research based on well grounded theoretical considerations and accurate knowledge of properties.

During discussion of the paper the speaker was asked to outline the type of data needed. Dr. Francis agreed to formulate specific recommendations on the kind of information that should be made available and to present these recommendations to the section at a later date.

Dr. W. K. Lewis of the Massachusetts Institute of Technology reported that he and his colleagues became "very seriously perturbed" when they obtained an efficiency rate of 95 per cent for bubble plates. Dr. Lewis carried out a comprehensive study of rectifying column efficiencies, using a ten-plate 13½-foot bubble tower, testing binary and ternary mixtures as well as petroleum naphthas.

It was determined from the large amount of data obtained that the plate efficiency is increased by increasing complexity of the mixture distilled, as well as by increase in the degree of deviation from Raoult's law.

The method used by Wilde to calculate bubble plate efficiency was employed in this study, and in the opinion of Dr. Lewis is the best basis available for designing fractionating equipment.

10 Per Cent Point of Motor Fuel Should Not Exceed 140 F.

THAT the ten per cent A.S.T.M. distillation temperature of a motor fuel should not be higher than 140 F. if the engine in which it is used is to start easily at zero F. is the conclusion reached by Dr. O. C. Bridgeman of the U. S. Bureau of Standards, in his report of investigations on this subject. Such a fuel will permit easy starting in cold weather, but will boil if heated above the temperature of the ten per cent point. If lines or carburetor reach a temperature in the neighborhood of the ten per cent point vaporization of the fuel will occur and the resulting vapor lock may interrupt the operation of the engine.

Dr. Bridgeman has found by exhaustive research that in 38 aviation and motor fuels tested, representative of the gasolines sold in this country, the A.S.T.M. distillation temperature of a fuel at the ten per cent point is a measure of the initial boiling point of that fuel. From this data the gasoline manufacturer may predict with reasonable certainty, from laboratory data always available, the temperature of the carburetor at which his product will be likely to cause stoppage by vapor locking.

Dr. Bridgeman also showed how the vapor pressure of gasoline may be estimated, to within 0.2 to 0.3 pound per square foot, using the data obtained from the A.S.T.M. distillation. Obviously the calculation of vapor pressures by this method, from data easily obtained, simplifies the work of the gasoline shipper especially, enabling him to determine with fair accuracy if his product meets shipping regulations, without the necessity of making the standard vapor pressure test.

D. B. Brooks and C. S. Bruce of the same bureau reported that, as a result of their investigation of relative effectiveness of acceleration of fuels in airplane engines, no one point on the distillation curve can be selected as representing the probable performance of the fuel. This performance is dependent on the characteristics of practically the entire A.S.T.M. curve.

To facilitate cooperative study of the problem with four automobile companies, the authors devised a portable spark-accelerometer, for measuring the rate of acceleration of an engine under test. Briefly this apparatus consists of a moving tape, driven from the engine, which is punctured at intervals of one-sixth of a second. The measure of acceleration is the rate of increase or decrease in the distance between punctures.

The newly completed model of knock-testing engine designed by the Waukesha Co. in cooperation with the fuel research committee was shown and discussed by Dr. H. L. Horning. This apparatus represents the combined efforts of the foremost investigators of this problem. It is a single-cylinder, variable compression engine fitted with all necessary control, indicating, and recording instruments designed in the light of past experience in the study of detonation.

The apparatus is now undergoing preliminary test in the laboratories of the Bureau of Standards and the Waukesha Co., following which eight laboratories will collaborate in making comparative tests on six selected fuels by four different methods. From the results of these tests the committee hopes to be able to outline a standard test method by which anti-knock ratings may be standardized, Dr. Horning stated.

Confirming in general Dr. Bridgeman's findings on volatility as related to vapor lock, C. C. Moore Jr. and M. S. Reynolds of the Union Oil Co. of California presented data to show that a definite relationship exists between the vapor locking tendencies of normal aviation fuels and their A.S.T.M. distillation 10 per cent points. The authors obtained data to substantiate this conclusion by pumping fuels of various volatilities through fuel lines under different conditions of temperature and pressure, simulating flying conditions. They also determined that the average boiling point has little to do with the vapor lock tendency of a fuel, and that the 10 per cent temperature indicates the probability of vapor locking much more satisfactorily than does the initial boiling point.

The average height, or "ceiling" which may be reached by an airplane is determined in great measure by the fuel pump efficiency at high altitudes, along with the vapor pres-

sure of the fuel used. Assuming a pump efficiency of 200 per cent of the maximum engine requirements at sea level the authors determined the average height obtainable with a typical aviation gasoline at different fuel temperatures, and presented these results in graph form.

Neutralization Best Method Of Combating Corrosion

CLOSER cooperation between the refiner and the manufacturer of corrosion resistant materials, and a continued painstaking study of the whole problem of combating refinery corrosion will aid in the solution of the refiner's worries on this score. This is the opinion of Walter Samans expressed to the refiners at the annual meeting of the American Petroleum Institute.

Mr. Samans summarized the results of the year's work of the Corrosion Committee, pointing out the progress in reducing corrosion in stills, condensers, heat exchangers, and other types of equipment. The use of nickel-chromium tubes, and those made from Krupp alloys are apparently the most satisfactory, while chromium plating has given good results where resistance to abrasion is not required.

Study of marine corrosion is greatly handicapped by the difficulty of obtaining reliable test data. The short time tankers are in port, the loss of time in reloading if inspection of hulls and tanks is to be made thoroughly and systematically add to the difficulties of prosecuting a consistent plan of investigation.

The use of resistant paints and coatings has been studied in several localities, one Texas refinery having made 57 tests of as many paints on storage tanks, only four of which indicate any special corrosion-resisting properties. Panel tests of protective coatings are being extensively carried out and may give valuable information.

Stanley Gill of the Gulf Companies reported that the test of aluminum tanks on the high sulfide crudes of West Texas showed aluminum to be almost perfectly resistant to sulfide and most other corrosive agents where the conditions are such that the protecting film of oxide, formed on the metal surface, is not broken. Rupture of this film permits corrosion to continue, as it is the film of aluminum oxide which gives this metal its resistive property.

Further tests on the use of aluminum indicate that coating the base metal with aluminum foil, using an asphaltic adhesive material, produces a surface as highly resistant to corrosive materials as does the solid metal, especially on outer surfaces. The author also expects that this plan will solve the problem of inner coatings as soon as a completely oil-resistant adhesive is perfected.

Three methods of combating pressure still corrosion are available, according to Dr. Walter G. Whitman of the Standard of Indiana; injecting into the charge stream a solution of a neutralizing chemical, such as hydrated lime or caustic; refractory coatings, such as that recently announced by W. F. Faragher of Universal Oil Products; various resistant alloys such as the 18-8 chrome nickel steels.

Dr. Whitman thinks the neutralizer is the best solution of the trouble, since in this way corrosion is eliminated entirely, while the use of coatings of cement, or of alloys, concentrates the action on other parts of the equipment. Concrete linings must be replaced periodically and are not resistant to abrasive action, although such methods are in the experimental stage as yet.

The corrosion rate in cracking equipment is directly proportional to the amount of hydrogen sulfide present, either in the original charging stock or produced by decomposition of sulfur compounds present therein. E. Retailliau and F. R. Lang of the Shell Petroleum Corporation discussed data obtained by them to indicate that corrosion may be reduced to a minimum by eliminating hydrogen sulfide from the apparatus.

Process Temperatures Control Anti-Knock Qualities

CONTROL of cracking conditions in both vapor and liquid phase plants to obtain highest anti-knock values brought out a lively discussion in the session which was devoted to cracking.

The point was made by C. R. Wagner of the Pure Oil Co., in his paper on vapor phase cracking that the final products of the process were formed by secondary reactions. He gained this opinion when he discovered that properties of gas and distillates from widely different charging stocks were virtually identical.

During the discussion Mr. Wagner was asked why he chose temperatures of 1030 to 1150 F. for his operations. His reply was that below 1030 F. the gasoline produced was much inferior in anti-knock qualities.

The question was raised as to whether true vapor phase cracking was taking place at lower temperatures. Dr. Walter Rittman of Carnegie Institute of Technology answered this by saying that vapor phase cracking of a light charging stock might be done as low as 600 F. He said that it is entirely possible that the gasoline produced at the high temperatures may be the result of a tertiary or even more complex reaction.

Dr. Gustav Egloff reported improvement in the anti-knock qualities of liquid phase cracking plants operating on stock which is considered bad from an anti-knock standpoint. He said that a plant running Pennsylvania gas oil has been making consistently a product with a benzol equivalent of 47 to 53 per cent over a period of months. This was done at temperatures of the order of 910 to 935 F., far below the temperatures which had been mentioned in connection with the vapor phase processing.

Following the description of his new vapor phase process by Luis de Florez, Dr. R. E. Wilson of the Standard Oil Co. of Indiana grew reminiscent as he recalled the development of the use of radiant heat in tube stills. A few years ago, he said, refiners were willing to expose only about 5 per cent of the tubes in a still to radiant heat. And that 5 per cent gave most of the trouble. Now Mr. de Florez has built a still with almost 100 per cent of the tubes exposed to radiant heat and is having no difficulties at all. No tube failures have been reported in something like two years of operation at Bayonne.

Mr. de Florez suggested that the reason for this is that with all of the tubes exposed the relatively cool charge has a tendency to cool the

flame in the combustion chamber to a point where no damage is done. With low velocities in the tubes and only a few tubes exposed the radiant heat was too strong for the metal.

Dr. Wilson expressed the opinion that the de Florez process might be improved by adding a reaction chamber to the system to give a longer time element for reaction. In reply to this Mr. de Florez said that the most important point to him in the process was the accurate control of outlet temperatures. Without a reaction chamber he can control this factor completely, with one his control would be lessened.

Proposed Standard Knock Testing Engine Exhibited to A.P.I.

CHICAGO, Dec. 5

ONE of the new test engines developed by the Waukesha Motor Co. in collaboration with the U. S. Bureau of Standards and other cooperating organizations was shown before the division of refinery technology of the American Petroleum Institute. Dr. Horning of the Waukesha Co. discussed briefly the history of the development of this engine, and pointed out its salient features by means of lantern slides and the engine itself.

On account of the confusion existing in the industry regarding methods of knock testing, The Cooperative Fuel Research Steering Committee, which represents the National Automobile Chamber of Commerce, the American Petroleum Institute, the Society of Automotive Engineers and The U. S. Bureau of Standards some time ago took steps toward the consolidation of the efforts of investigators of this problem.

It was decided that the first step should be the design of an engine that could be used for testing motor fuels by any of the numerous existing test methods. The result of concerted effort is the apparatus shown and described by Dr. Horning.

Plans are already being carried out for the testing of this equipment by eight cooperating laboratories, testing six different fuels by four different methods. Before this work is begun the engine will be tested by the Bureau of Standards and the Waukesha company to find out the peculiarities of operation that may be likely to arise when the cooperating laboratories begin their work, in order to eliminate as far as possible difficulties and discrepancies at the outset.

Dr. Horning's description of the apparatus and the program of study laid out by the committee follows:

By H. L. Horning*

* * *

The qualifications in the design problem were:

1. First, that the equipment be universal, permitting testing as a fixed compression ell head engine, or as an overhead valve variable compression engine; that it be suitable for the throttle method, or the spark method; that it be adopted for a bouncing pin indicator or a listening post; that the engine operate with a uniform jacket temperature; and that it have convenient outlets for accessory drives, thermometers, etc.

*Waukesha Motor Co.

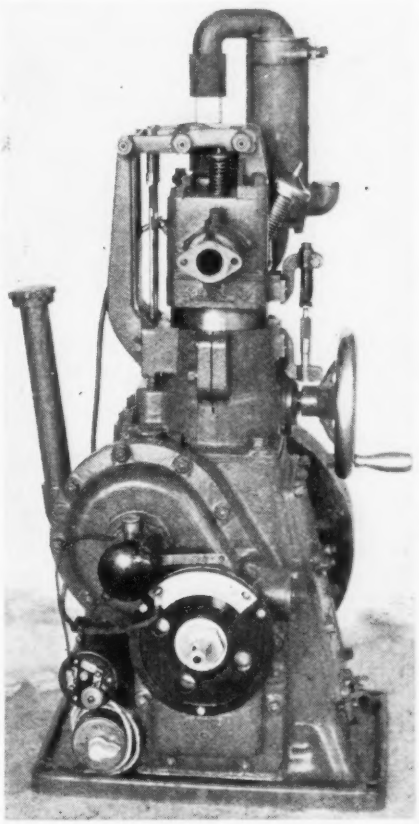

Fig. 2. Showing valve-compensating device, and spark-indicator

2. That the engine be unusually rugged and free from the weaknesses and unreliability of conventional designs.

3. That the design be such that the cost would be low enough to permit general use of the engine throughout the industry. These three qualifications have been met, but are being given final tests by the committee.

The crankshaft, rod and piston assembly have relatively oversized bearings and provide shaft stiffness. These same bearing dimensions are considered large on a commercial engine with 60 per cent larger piston and operating at three times the speed. The counterweights are also shown which permit very smooth operation up to 1800 revolutions per minute, although the normal speed for fuel testing is only 600 revolutions per minute.

The piston is made of cast iron to permit accurate close fitting in the cylinder. It is made long to give great bearing area and prevent tilting with resulting ring leakage. It carries four compression rings and one oil control ring. The skirt is a large unbroken surface except for the wrist pin holes. It is intended to flood lubricate the cylinder and piston skirt and control the oil to the compression rings and combustion chamber by means of a suitable oil control ring.

The tendency for an iron piston to run at a considerably higher temperature than aluminum alloy pistons has been largely offset by the unusual metal thickness used. This heavy construction also gives a very rigid structure which is a great advantage in prolonging the life of the parts. The great weight of this piston is warranted because of low normal operating speed of 600 revolutions per minute.

The connecting rod is also unusually heavy to carry detonation stresses. It is rifle drilled to supply oil under pressure to the floating wrist pin.

In order to carry this feature of unusual rigidity and strength consistently through the entire design the crankcase which is the foundation for the whole mechanism is made as shown in Fig. 1. The metal thickness in the front and back walls of the box like case is one inch thick. This provides a rigid carrier for the main bearings. The long double rear bearing between the flywheel and crank is shown. This feature reduces crankshaft bending from flywheel reaction.

The cylinder barrel extends down into the crankcase. This construction permits a higher, stiffer crankcase and places the cylinder hold down bolts in a more advantageous position with regard to rocking from piston reaction.

The engine is designed so that it can be converted from a fixed compression ell head engine to an overhead valve variable compression engine by merely changing the two cylinder assemblies. This process does not disturb the valve timing or camshaft drive in any way. Figure 2 shows the means of compensating the valve clearance on the overhead valve engine when the cylinder is raised or lowered.

The fulcrum of the valve rocker arms is carried at the midpoint of a lever, one end of which is fixed to the crankcase and the other end moves with the cylinder. The rocker arm fulcrum, therefore, moves half the distance the cylinder moves, which is the amount necessary to keep the clearance constant. This mechanism makes it possible to build a variable compression engine for considerably less money than is possible with an overhead camshaft.

The spark indicator is shown clearly in Fig. 2. It consists of a neon tube carried in a pocket in a bakelite disc behind a quadrant graduated in degrees. The quadrant is connected on a dead end of the spark plug wire. The neon tube flashes bright at the time spark occurs and is seen through a narrow slit in the side of its socket. This makes a bright line at degrees of spark advance on the quadrant. This indicator, therefore, produces a continuous optical indicator of the exact spark setting without any attention from the operator. The General Motors laboratories originated this device.

An electric hot plate is attached to the bottom of the oil pan to promote rapid warming of the oil at the start of the day's run. Without this means it takes from two to three hours to bring the oil in the base up to equilibrium temperature. This hot plate is controlled by a three heat switch shown in Fig. 2.

Lubrication is by pressure from a gear pump through drilled passages in the crankcase walls, crankshaft and connecting rod to all bearings. Constant pressure is regulated and maintained by means of a spring loaded relief valve. The oil hole in the crank pin is located as indicated 45 degrees toward the leading side of the journal.

This is the optimum position for the oil hole in accordance with the generally accepted theories on the behavior of oil in bearings. It feeds oil in ahead of the maximum pressure area, and it leaves an unbroken surface at the time of maximum pressure just after top dead center.

Radial drilling of the crankpin as is common practice defeats both of these

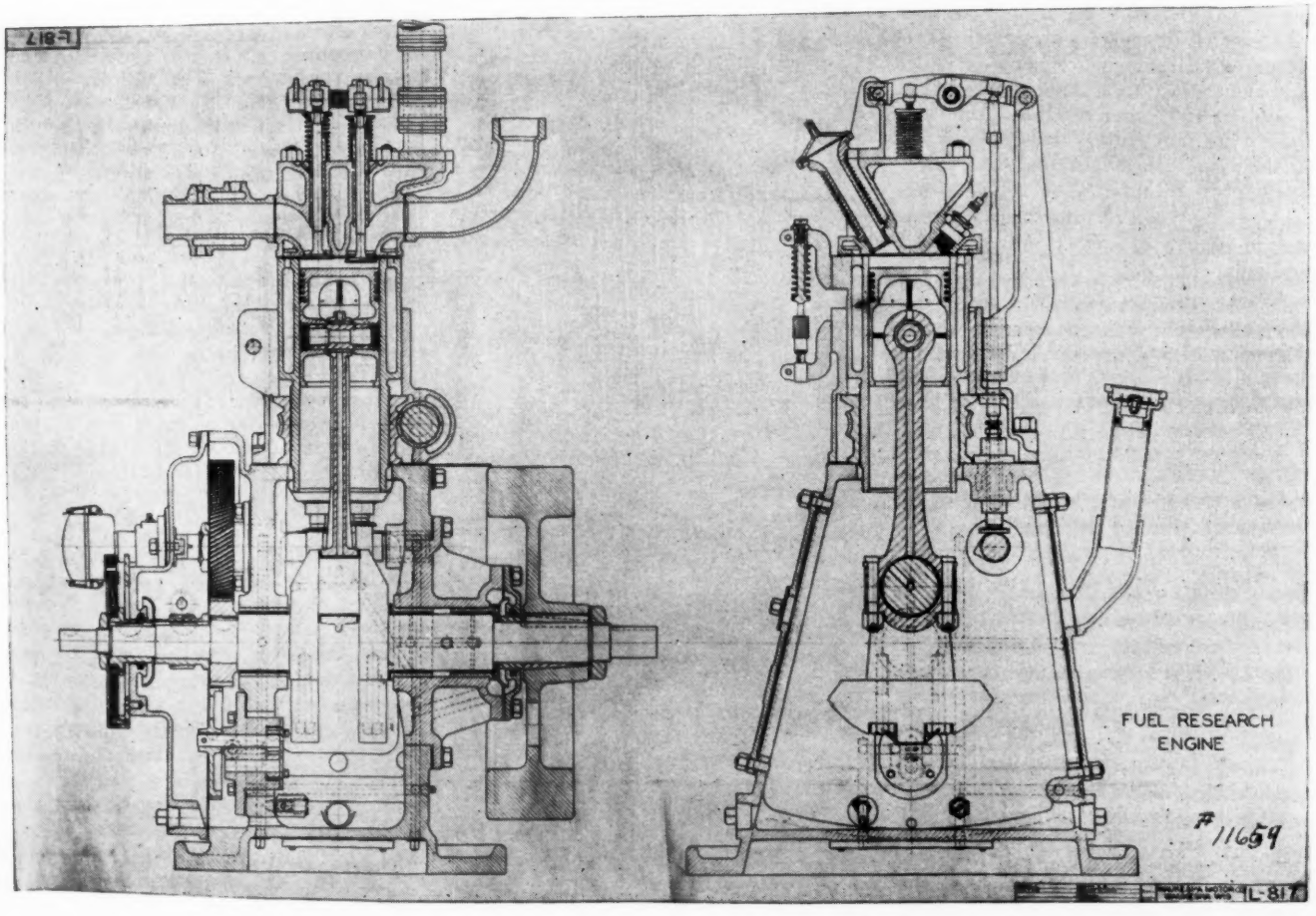

Fig. 1—Cross section of experimental test engine, showing over-size construction

purposes. At the time of maximum pressure oil passage from the hole is practically shut off and the surface of pressure is punctured by the oil hole.

The timing gears are lubricated by a stream of oil directed at the point of mesh.

In a single cylinder engine some difficulty is experienced due to the breathing action in the crankcase discharging oil through all openings. To counteract this effect the crankcase is operated at a partial vacuum. A check valve in the oil filler cap is the means employed to maintain the partial vacuum.

In order to make the valve reasonably quiet it is made very light and the travel is kept to approximately ten thousandths of an inch by a stop screw with cushion washer under its head. The seat of the valve is made very narrow to prevent valve sticking from any cause. In addition to the use of conventional oil slings where shafts leave the crankcase there is a felt packing at each of these openings.

The camshaft is driven by a single pair of wide helical gears, as this is considered the most reliable and accurate method; of operating the camshaft.

The ignition breaker cam is driven directly from the end of the camshaft through a single tooth clutch.

There is a standard S.A.E. tachometer shaft opening driven by a crossshaft on the front of the crankshaft.

A vapor cooling system is incorporated in the engine to produce a uniform jacket temperature regardless of the load or other operating conditions. The normal water load is just above the top of the combustion chamber. Steam flows from the top of the cylinder head into the top of the condenser, down to the bottom of the baffle tube and starts up around the cooling coils through which there is a circulation of cool city water.

The steam is condensed by contact with the coil and drops back into the condenser body where it flows by gravity back into the water jacket, when the cycle is repeated. This gives a uniform jacket temperature of about 208 degrees Fahr. without attention to regulation of the cooling water circulation because only as much heat is carried off by the cooling water as is required to condense the steam.

At the suggestion of one of the committee thermocouples were installed in the cylinder head to permit a study of the influence of combustion chamber wall temperature upon detonation. In accordance with the theory outlined in Technical Paper 114 of the Bureau of Mines, this installation measures the temperature at within and not at the surface of the combustion chamber wall.

Due to this fact, and to limitations as to the location of this type of couple, it was decided to locate couples to measure the combustion chamber surface temperature. The installation was made by first cementing the iron and constantan in a porcelain insulator. Porcelain cement was forced through the holes by means of an improvised pressure gun. The wires were then inserted in the holes while the pressure gun was still attached. This filled the space between the wire and porcelain completely with cement.

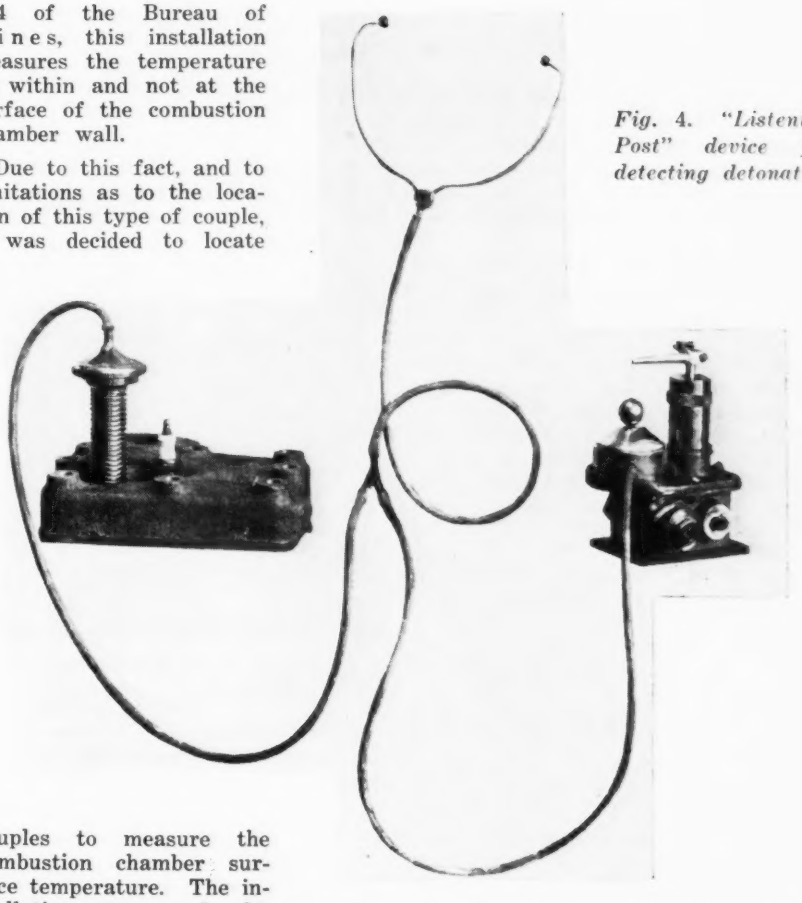

Fig. 4. "Listening Post" device for detecting detonation

After hardening, the insulator and wire assembly were inserted in a sleeve, and held by a packing nut at the top, as illustrated. The ends were inserted in holes drilled in the combustion chamber wall and anchored with a peening punch, as described on page 11 of the above bulletin. A slot had to be cut in the side of the punch to get around the wire and the peening action only included a portion of the circumference of the wire. This method, however, anchors the wire very securely.

Seven heads were equipped with thermocouples and put in an oven and heated uniformly at the same time. The temperatures recorded were within a range of 5 degrees Fahr. for all of the heads, which would indicate that the couples were reading correctly.

In the development of a universal knock test outfit, it was found that no carburetor was in existence which would meet the requirements of all the different methods of fuel test. All of the carburetors available had been developed for use with one particular method of test, and for a narrow range of operation.

The Bureau of Standards has been able by means of a special plate orifice jet in the Ethyl Gasoline Corp. carburetor to obtain a uniform air fuel ratio over a fair range of loads. The committee is using this carburetor in its comparison of knock method work. Fig. 3 shows a new carburetor being developed which contains all of the features of various existing carburetors. In addition it has a combination air bleed compensating jet which gives a uniform air fuel ratio over a range from one half to full load. It also has a combination four way valve, which switches the fuel supply from one side to the other, and also drains the fuel from the inoperative side down to the bottom of the jet.

Dynamometer equipment cannot be standardized until the method of test has been determined. Therefore, to be perfectly flexible in this preliminary work a standard laboratory type of cradle dynamometer is the apparatus generally used. The positive

displacement type meter used in measuring the air for carburetor development is also shown.

It is fairly well agreed that 600 revolution per minute is a desirable operating speed for the engine. This permits the use of constant speed apparatus such as an oversize induction motor or a synchronous generator.

The General Electric Co. has built a special cradle dynamometer with a synchronous generator. This machine has not yet been tested. It seems likely that eventually it will be practical to use nothing more expensive or complicated than an ordinary induction motor for absorbing the engine power. This method is in use by The Texas Co. at the present time.

The bouncing pin indicator is used extensively to compare the relative intensity of knock of two fuels when run in close succession, at constant engine operating conditions. The sensitivity of the device in detecting variations of knock intensity is excellent. Its use is somewhat limited by the fact that it cannot be controlled for use as an absolute measure of knock intensity and by the fact that it operates most satisfactorily at a degree of knock intensity somewhat higher than the actual highest useful compression ratio of the engine.

When the bouncing pin indicator is not used the determination of knock intensity is generally left to the judgment of the operator through his sense of hearing. In order to overcome a portion of the resulting personal equation a device has been made to give a standard knock to be used by the operator as a standard of comparison. This consists of a mechanism which drops a steel ball from a given height on a sound box cover.

Ear pieces with double branches, one leading to the standard knock producer and the other leading to a "listening post" in the cylinder furnish the means of comparing the intensity of engine detonation with the intensity of a standard easily reproducible sound (see Fig. 4). The tone of the two sounds is not identical, but the listening post has been so arranged that it damps out a large proportion of the engine noises and lets the detonation come through distinctly.

The noise from the knock producer is then used simply as a match for apparent intensity and not quality, and is an effective aid in steadying the judgment of the operator. Independent operators averaging four readings often check within a fifth of one per cent in setting the throttle to produce a standard knock and seldom vary by more than one per cent.

This apparatus was developed for use on a fixed compression ell head engine. When it was attempted to use it on an overhead valve variable compression engine the valves seating in the head transmitted their sound to the listening post and made it difficult to distinguish the detonation sound. The valve noise was then eliminated, but the detonation characteristic in the overhead valve engine did not make itself clearly defined. The normal explosion noise was transmitted to the listening post so that its sound was very similar to the detonation sound. Detonation could be distinguished when it came in, but it was not sharp or distinct.

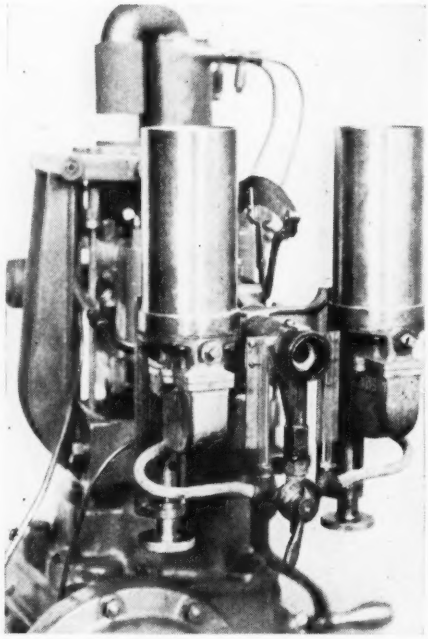

Fig. 3. Closeup of fuel containers and carburetor mechanism

A development is under way on the bouncing pin which makes it responsive to knock intensity only and not to cylinder pressure.

Results obtained to date indicate that this modified bouncing pin can be developed so as to be used as a gauge of standard knock intensity for either the throttle method or variable compression method of testing.

In using the variable compression method the problem of regulating the spark position has always been troublesome. The engine should be run with optimum spark setting for the compression ratio used. A method for mechanically regulating the spark for the compression ratio without attention from the operator has been worked out.

The optimum spark setting was first determined for the range of compression ratios from 4 to 1—8 to 1. It was found that there appeared to be a fundamental relationship between combustion chamber volume and optimum spark advance. In fact, the optimum spark advance was directly proportional to the combustion chamber volume for this range of compression ratios within the limit of experimental precision.

This means that a linkage which will vary the spark advance in proportion to the cylinder travel is all that is necessary to give the correct spark setting. In practice this was reduced to the simplest sort of a mechanism; namely, a bracket bolted to the movable cylinder with a link between the end of the bracket and the spark lever.

With the development of bouncing pin apparatus suitable for use as an indicator on a variable compression fuel test, and suitable means for keeping the spark automatically in the correct position for the compression ratio, the variable compression method of fuel testing appears in a more favorable light than it has in the past. The very fundamental nature and significance of the results obtained by this method make it a desirable knock index of the fuel. By being able to eliminate the troublesome personal equations, this particular method becomes more practical.

The committee has met with cooperation on every side, and has had gestures from technical bodies of foreign countries, who are anxious to contribute to this work.

While it is hoped by some that this engine is close to the final form, the committee desires that it be considered at this stage as being developed for the tests about to be undertaken; and that a final engine will probably be built suitable for the standard test procedure, which it is hoped will be the outcome of the above tests.

Complimentary Dinner Given C. M. Fuller

CHICAGO, Dec. 5.—A dinner in honor of C. M. Fuller, president of the Richfield Oil Co. of California, was given Dec. 5 in the Congress hotel, at which about 50 newspaper and trade paper men were present.

Sharing the attention of the guests were A. C. Woodman, head of the Richfield Oil Corp. of New York, and Col. Arthur C. Goebel, the aviator.

A film picturing the development of aviation from the days of the Wright brothers at Kitty Hawk, N. C., to the new 100-passenger Dornier plane recently completed in Germany was shown.

J. T. French, assistant to Mr. Fuller, said the film had been made from negatives collected from museums in both Europe and the United States.

Relation of Trade Commission to Codes On Marketing Is Defined

CHICAGO, Dec. 9

THE attitude of the Federal Trade Commission towards trade practice conferences held by an industry was set forth in an address prepared by M. Markam Flannery, director of the trade conference section of the commission, and read before the institute group meeting on marketing problems here today.

Henry M. Dawes, Pure Oil Co., vice president of the institute in charge of marketing, presided at this group meeting.

The trade commission does not enforce rules of marketing codes as such, Mr. Flannery brought out. It enforces the law under Sec. 5 of the Federal Trade Commission Act which directs the commission to prevent the use of unfair methods of competition when against the interests of the public.

Trade conference rules are regarded by the trade body as the industry's own definition of particular practices which experience has shown should be abandoned in the interest of safe, sane and profitable business.

The holding of a trade practice conference by an industry, stated Mr. Flannery, was regarded by the commission as evidence that unfair methods of competition were formerly being practiced within that industry and the commission then exercises its functions to prevent the further use of such practices.

"The legal effect of holding a trade practice conference is to dismiss formal complaints and complaints in the informal stage on the ground that the use of the unfair practices complained of no longer exists," said Mr. Flannery. "This should answer the question of the authority of the Federal Trade Commission to hold trade practice conferences."

He stated the commission regarded it as contrary to the best interests of all concerned when business firms sent in signed acceptances in which they agreed to abide by some of the rules and not by others.

By M. Markam Flannery*

SECTION 5 of the Federal Trade Commission Act directs the Federal Trade Commission to prevent the use of unfair methods of competition in commerce when it is in the interest of the public to do so. This part of the section is mandatory. The section also provides a procedure to be followed, but the procedural part is not mandatory.

Thus, it provides for the taking of testimony, yet unqualified admission of the charges of a complaint or the signing of a stipulation as to the facts in lieu of the taking of testimony will support an order to cease and desist and the purpose of the statute is accomplished and an order based on a stipulation or admission will be sustained by the court, although the procedure provided in the statute was not followed in form but was followed in substance.

Likewise in holding a trade practice conference the purpose of the statute, namely, the prevention of the further use of unfair methods of competition, is accomplished without the issuance of complaints and orders to cease and desist.

In any procedure under Section 5, however, the Commission must have reason to believe that an unfair method of competition is being used in commerce. In the holding of every trade conference the commission has had reason to believe that many persons, firms and corporations were using unfair methods of competition. The application for a conference informs the commission of this and the resolutions adopted at the conference admit it.

Therefore, the commission, having had reason to believe that many persons in an industry were using unfair methods of competition which it was in the interest of the public to prevent, carried out the mandate of the statute by exercising its functions to prevent their further use.

It might have proceeded to do this in either of two ways. First, it might have made an intensive investigation to identify the users of such unfair competition, issued its complaint against the individual persons, firms and corporations alleged to have used the methods specified, spent thousands upon thousands of dollars in the taking of testimony, and subjected many members of the industry to the annoyance, embarrassment, inconvenience and expense incident to such litigation and its attendant publicity. But this would not have accomplished the mandate of the statute as completely as is accomplished by the holding of a trade practice conference.

It might, as it did, through holding a trade practice conference, avoid all of the expense, and so on by accepting admissions that many unfair methods of competition were being used and accepting individual pledges or agreements (as is done in a consent decree) to abandon the use of the methods defined and denounced in the resolutions adopted.

The affirmative approval of trade practice conference resolutions is the official act of the commission and undoubtedly fully warranted by the statute. In affirming Group I resolutions the commission in effect says to each individual member of an industry: "If you cease and desist from the use of the methods of competition defined in trade practice conference resolutions the commission will refrain from issuing a complaint against you."

Formal complaints as well as complaints in the informal stage are dismissed outright as results of holding a trade practice conference where the respondents accept and agree to abide by the rules adopted. Thus, in the correspondence school industry, more than 90 separate complaints were dismissed solely as the result of holding a trade practice conference for that industry.

The legal effect of holding a trade practice conference is to dismiss formal complaints and complaints in the informal stage on the ground that the use of the unfair practices complained of no longer exists and there would be no public interest in conducting a formal trial to stop that which has by reason of the trade practice conference already ceased to be used. This should answer the question of authority of the Federal Trade Commission to hold trade practice conferences.

As to treating every assemblage of

*Director Trade Practice Conference, Federal Trade Commission.

competitors with distrust and suspicion and regarding every agreement between competitors as a conspiracy in restraint of trade, it may be well in passing to refer briefly to recent decisions of the United States Circuit Court of Appeals designated by the court as companion decisions. Some, if not all, of the questions at issue were covered by a trade practice conference previously held for the industry involved. During the taking of testimony and in the briefs submitted the trade practice conference was pressed on the attention of the court, which while not mentioning the trade practice conference by name stated that:

"Combinations and agreements designed to promote fair and honorable dealing and to correct fraudulent and irregular practices in themselves obstructive of trade are not unlawful if in purpose and effect they do not supress competition but merely regulate competition and thus promote the free flow of commerce."

It is hardly necessary to remind you that neither this decision nor the trade practice conference procedure gives any license to the members of an industry to fix prices, divide territory, allocate customers, or violate the law in any other way. A trade practice conference must not be erroneously taken as bestowing a liberty to do anything which the law prohibits.

On the contrary a trade practice conference is intended to wipe out illegal practices and to enable industry to do business in perfect accord and harmony with the law by agreement among the members to wipe out not only illegal practices but "near" illegal practices, and even obviously legal practices which, however, may be inherently bad business practices, if by common consent they decide to do so.

* * *

For the benefit of the more technical, let it be said that the commission does not enforce rules as such. It enforces the law. Trade practice conference rules are the industry's own expressions, used to describe in a way plainly understandable to members thereof particular practices which experience has shown should be abandoned in the interest of safe, sane and profitable business.

Therefore, when the industry has met on the common ground provided by the trade practice conference and agreed as far as it can agree, acting under the auspices of a truly disinterested umpire, leaving time and future conferences to work out the unsolved problems, it has acquired a new practical, improved competitive status which every sane business man should welcome, appreciate, encourage, accept and wholeheartedly support without thought or question as to compulsory enforcement.

* * *

However, the commission will enforce any rule the violation of which involves a breach of the law which it administers. It has considered the resolutions which you as an industry have adopted. By its acceptance thereof they are regarded as the rules of business conduct for the industry on the subjects covered. It has divided these into groups. Those appearing under Group I the commission has affirmatively approved. That is tantamount to saying that it will issue its complaint against any who use the practices dealt with by these rules.

Those appearing under Group II are accepted as expressions of the trade, and the practices usually dealt with under this group obviously are not in and of themselves violations of the law. Both classes, namely, rules accepted by the commission as expressions of the trade as well as those affirmatively approved, are usually observed and have resulted in the abandonment of many bad business practices to the lasting good and financial benefit of industry.

The commission encourages each industry to police itself. It is hardly necessary to say that the commission cannot delegate any portion of its power of enforcement by reason of any machinery which has been set up, but such machinery must in the first instance depend on moral suasion, argument and education, and on final resort to the commission by application to it to exercise the power which Congress has invested in the commission.

Care should be taken to avoid undue compulsion or opposition. The rules naturally must be interpreted finally by the commission, but no attempt should be made by the industry to stretch a rule so as to cover a situation beyond its scope.

The question has arisen as to the signing of acceptances whereby a concern agrees to abide by some rules and not by others. This would seem to be clearly contrary to the best interests of all concerned. If there were ten Group II rules and each was objected to by a different individual concern the ten rules would soon break down, because if one revives or continues a practice which the vast majority has condemned others will do so. Therefore it is better to accept and abide by all rules, bringing up the matter of changes or objections at a future conference. This matter, it is expected, will be brought to the attention of the commission in the near future on the theory that one should accept all or none of the rules. In other words, it would seem that voluntary cooperation if it exists should be wholehearted.

Government Survey of Marketing Explained to Institute

CHICAGO, Dec. 6.—The plan for a survey of the petroleum industry in the southwest and its effect on the economic growth of that section of the country, the work to be carried on by the U. S. Department of Commerce, was put before the Institute group meeting on marketing Dec. 4 by C. B. Eliot, of the Domestic Commerce Division of the department. Mr. Eliot is in charge of the petroleum survey.

Directors of the institute later passed a resolution offering the cooperation of the institute in every way possible in the proposed survey.

The petroleum survey is one of a series of regional market studies aiming at the interpretation of the commercial structure of the country, Mr. Eliot explained. "For this purpose the country was divided into nine divisions, so chosen that as far as possible the marketing and commercial structure of each was homogeneous but different from all other areas.

"In each area commodity movements and the machinery of distribution are treated; merchandising methods, buying habits, credit trends and a host of other factors are considered. All of these interrelated commercial facts are essential to an intelligent understanding of the region and to the planning of well directed business operations."

The study of the southeast divisions, the New England and the Pacific Southwest areas have been completed. The study of the Pacific Southwest takes up the oil industry but only in a general way, giving facts as to production and refining operations. The complete survey of the petroleum industry is to be made in the southwest because this terri-

tory is one in which all branches of the industry are carried on. The study of the manufacture and distribution of oil well supplies is also to be made in this district because it is regarded as important in the economic growth of the country.

The study of the oil industry will be divided into three parts, Mr. Eliot explained. One section will be a compilation of statistics gathered by the Bureau of Mines, the Institute and other agencies and will show the growth of the production and refining branches in the Gulf southwest. Another section will attempt to show what an important part the oil industry has played in the economic growth of this territory.

The last section of the report will be a new study as far as the oil industry is concerned, namely the complexities of the distribution today of petroleum products. A questionnaire has been prepared to send to all distribution facilities, those of the big companies and the independent station operator as well. It asks for a wealth of detail as volume of business done, type of station, nature of services offered, margins and profits, which, if secured from any number of companies will give the industry facts regarding the distribution of its products which it has never had before.

"We are trying to collect information with regard to the marketing and distribution of petroleum products which will help you gentlemen in promoting your sales and marketing policies in a more scientific and less wasteful manner than is possible unless you have the facts of present day distribution to work upon," said Mr. Eliot.

Swigart New National Chairman Of Production Division

CHICAGO, Dec. 5

T. E. SWIGART, superintendent of production for the Shell Petroleum Co. of California was elected national chairman of the American Petroleum Institute division of development and production engineering. J. R. McWilliams, engineer, Skelly Oil Co., Tulsa, was elected national vice-chairman.

This action was taken at the annual business session of the division on Thursday. Mr. Swigart, who was vice-chairman the past year, succeeds John R. Suman, of the Humble Oil & Refining Co., who was national chairman for the past two years.

Mr. McWilliams was chairman of the Mid-Continent section of the division during the past year and gained national recognition through his work in organizing field chapters of the division at centers in Kansas and Oklahoma. Mr. Swigart, in accepting the national chairmanship, said that in the past the vice-chairman had been given no duties but that he proposed to delegate to Mr. McWilliams the especial task of pushing the field chapter idea, setting up such organizations in the various oil producing states.

The division will be merged into the newly created Division of Production of the Institute, which will embrace all matters pertaining to production. Mr. Suman said that executive officers of the Institute had said that it might be a matter of several months before the details could be arranged and that the division of development and production engineering should go ahead on the old basis.

T. E. Swigart

It was voted to add the Panhandle of Texas territory to the Mid-Continent section. Districts have been organized in the past by grouping whole states. It was explained that the Panhandle from an operating standpoint is more closely related to Oklahoma and to Tulsa. It was voted also to add southeast New Mexico to the Southwest division.

Mr. Swigart announced the appointment of several new national committee chairmen. David L. Trax, of the Gypsy Oil Co., Tulsa, heads the committee on prime movers; J. French Robinson, of Pittsburgh, is national chairman of the nomenclature committee.

E. G. Gaylord, Los Angeles, was announced as the new national chairman of the drilling practice committee and W. W. Scott, Humble Oil & Refining Co., national chairman of the production practice. F. W. Lake, Los Angeles, was reappointed to head the committee on programs and publications.

In the short report made by the retiring chairman the desirability of getting more papers on foreign practice was stressed. Mr. Suman suggested that the Eastern division hold itself in readiness to handle assigned topics, as most South American operating companies are domiciled in New York.

Mr. Suman also expressed the wish that the Institute division will interest itself keenly in unit development so that basic principles will be laid down so that the entire industry may have them.

Tests of Pipe Coating To Be Continued

CHICAGO, Dec. 5.—Exhaustive tests on pipeline protective coatings are to be made in 1930 by the United States Bureau of Standards under a program sponsored by the American Petroleum Institute upon recommendation of its standing committee on production and pipeline corrosion.

Details of the plan are to be made public at a later date, it was indicated after a meeting in Chicago, Dec. 3, when representatives of the various pipe coating manufacturers met with Institute members.

After Dr. Gordon N. Scott had submitted his report as A.P.I. research associate at the Bureau of Standards, the General Committee recommended that his work be continued and expanded.

High Gas Volumes Handled In Repressuring Work

By Paul Wagner
N. P. N. STAFF WRITER

CHICAGO, Dec. 5

GAS injection pressures required in excess of normal rock pressures now amount to only 20 to 25 pounds in the Sugarland field of the Humble Oil & Refining Co., in Gulf Coastal Texas, notwithstanding the handling of a repressuring volume of 1,000,000 to 1,250,000 cubic feet daily.

When repressuring work was first taken up several months ago, injection pressures were less than 100 pounds per square inch greater than formation pressures, it was brought out in a production practice discussion at the American Petroleum Institute by W. W. Scott, the Humble's chief petroleum engineer.

It had been previously brought out that in certain other fields of Texas, where the formation pressures were only a few pounds above atmospheric pressure, the injection pressures had been as high as 150 pounds greater per square inch; in some wells up to 300 pounds.

The Sugarland field is an example of an oil area under single-company development control where effort is being made to maintain formation pressure throughout its oil producing life.

Increased recoveries of oil from Sugarland, in contrast with usual producing practice, are not as yet measurable under the Humble's repressuring system, which was begun only a few months ago.

Mr. Scott reported, however, that in Brown county, central north Texas, repressuring in the early life of the territory had brought about a 20 per cent increase in the quantity of oil recovered. His remarks referred to a group of 137 wells producing in the Stover shallow sand pay field.

"It is interesting to note," Mr. Scott said with reference to the Brown county operations, "that about 26 per cent of the volume of gas has been returned to the formation; that is, of the total amount of gas that has been produced in the life of the field.

"However, at the present time we are returning about equal amounts of gas to the sand, equal to the amount we are producing each day."

H. D. Wilde of the Humble's engineering department supplemented Mr. Scott's remarks on Sugarland by saying that gas injection work there has been carried on through two wells.

"In one of them," he said, "we have been injecting from 1,000,000 to 1,250,000 cubic feet of gas daily and the pressure, when we first injected, was a good deal less than 100 pounds, probably less than 50 pounds in the formation.

"The pressure now, apparently, is 20 to 25 pounds, even with the volume at 1,000,000 to 1,250,000 cubic feet of gas daily.

"The well which was used as a first injection well is located towards the crest of the dome (structure), so that undoubtedly a portion of the well is exposed to the free gas zone of the field. This particular well did produce oil before it was shut in and before it was used as an injection well.

"A second well, which is also located near the crest of the structure, has shown a gas volume as high as 2,500,000 cubic feet in the single well with the pressure in excess of about 20 to 25 pounds above the normal rock pressure.

"Because that is so at Sugarland does not mean that it will necessarily hold true of other fields. It is interesting to note, however, that it has been possible to get the high gas volumes into the formation at relatively low pressures in excess of the formation pressure itself.

"Formation pressure there is about 1350 pounds but the gas is being introduced at about 1370 to 1375 pounds."

Compressors capable of injecting 2500 pounds pressure at injection wells were installed under the Humble's Sugarland program, so that mechanically the field was equipped for whatever emergency arose.

Mattison Quits as A.P.I. Tax And Accounting Advisor

CHICAGO, Dec. 5

M. W. MATTISON who has been chief of the American Petroleum Institute's division of taxation and accounting since 1920, has resigned, effective Dec. 31, to return to private practice as a public accountant, it was announced at the Institute's annual meeting here this week.

The work of the Institute's general committee on uniform methods will be continued, it was announced, under the chairmanship of Rodney S. Durkee, comptroller of the Standard Oil Co. of New York, who was appointed to the post by E. B. Reeser, president of the Institute.

The general committee adopted the following resolution expressing appreciation of the work Mr. Mattison has done for the oil industry and wishing him success in his future work:

"WHEREAS, M. W. Mattison, who has actively served the Institute in the capacity of director of the division of taxation and accounting for nine and one-half years, and who has been acting continuously as general chairman of the committee on uniform methods of oil accounting since its inception, and

"WHEREAS, Mr. Mattison has announced his intention of retiring as chairman of this committee, effective Dec. 31, 1929, and,

"WHEREAS, Mr. Mattison has not only rendered conspicuous service to the petroleum industry by his leadership in the development of accounting standards but has also been of invaluable assistance to the industry at large in his able interpretation and presentation of the vexatious problems of federal income taxation affecting the members of the industry, and,

"WHEREAS, Mr. Mattison has performed his duties at a considerable personal sacrifice,

"BE IT RESOLVED, that the members of the committee express to Mr. Mattison their appreciation of his services and their earnest hopes for his success in his future business associations."

Mr. Mattison is senior partner in the accounting firm of Mattison, Davey & Winters which has offices in New York, Washington, Shreveport, Houston, Tulsa, Los Angeles, and San Francisco. The firm has specialized in oil industry work.

American Petroleum Institute . . . Chicago, Dec. 3-5, '29

Straight Hole Drilling Practice

Compiled by John Franklin Dodge*
National Secretary of the Drilling Practice Committee

(Presented before the American Petroleum Institute, Chicago, Dec. 3-5)

DURING the past twelve months no problem in oil field development has attracted more attention than that of how to drill a straight hole. At its meeting a year ago the National Committee on Drilling Practice of the American Petroleum Institute chose "Straight Hole Drilling Practice" as one of the most important for study during the year and last spring prepared a questionnaire and drilling report form for use in assembling data for study.

Similarly the several regional subdivisions of the Division of Development and Production Engineering have made this question the subject of a number of papers and discussions at their meetings throughout the year. This paper is in the nature of a summary or progress report, and will attempt to cover the results obtained to date in this study, but does not attempt to answer categorically all the questions which have been raised during the work.

The question might be raised as to why the problem of straight holes has suddenly come to notice. Crooked holes have been drilled for years, but it is only with the increasing depth that straightness of holes has begun to be emphasized. Within the past five years drilling equipment and technique have been so improved that the possible depth attainable has been doubled and it is in this increased depth that the deviation from straightness has forcefully demanded attention. Failure of the crooked hole to reach its proper destination, wrong geologic correlation, operating difficulties with the completed hole and the property line bogey, mentionable only in a whisper, are the principal and sufficient reasons why a hole should be straight.

Two points of view regarding the drilling of straight holes present themselves at once. One group of engineers is inclined to the opinion that straight holes should be drilled at any cost while to a larger group, distinctly in the majority, take the position that reasonably straight holes should be drilled with some consideration given to drilling progress and expenditure for drilling equipment.

It is believed that the question of how to drill straight holes can more easily be answered than how to drill rapidly and cheaply and still have the hole straight, and it is therefore to the second viewpoint that our attention has been directed.

Source of Data for this Paper

Three sources of data have been drawn upon in the compilation of this report. The A.P.I. experimental form for straight hole drilling practice and summary sheets thereof issued by the national committee, the questionnaire outline of study for straight hole drilling which was likewise sent out by the national committee and the reports and papers, prepared by the regional committee and forwarded to the writer by the chairman of these committees and others interested. The writer wishes to acknowledge at this time the assistance of all these groups, operators, contractors and individuals, too numerous to mention individually, and in

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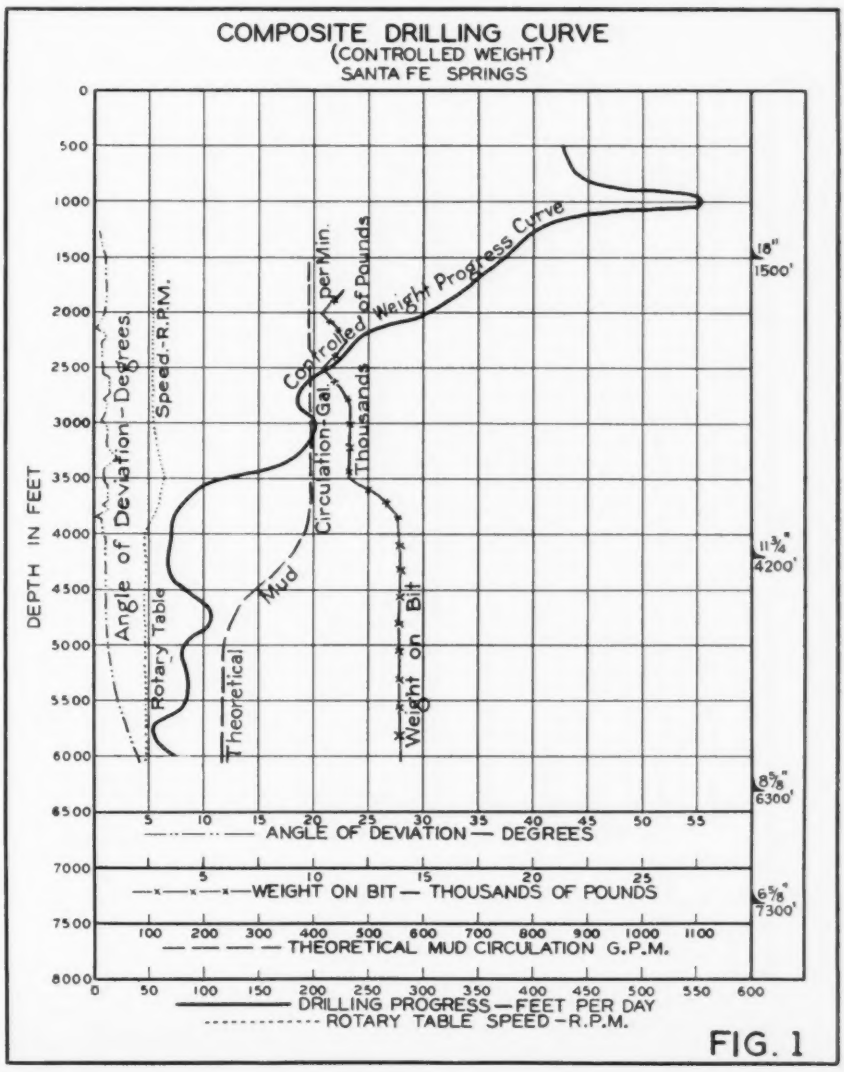


FIG. 1

particular the work of the regional committee chairman, Mr. Wendell Jones, Mr. Melbert Swartz and Mr. Charles Jacobsen.

A considerable number of the experimental data, from the drilling even in the short time available and the writer received summaries on 25 wells from the California committee, 13 from the Texas-Louisiana committee, and 2 from the Mid-Continent area. The questionnaires were very much more widely disseminated and a mass of what might be termed opinion-data in distinction to the experimental data, from the drilling sheets, obtained.

Definitions

In order that there may be a clear understanding of the terms employed it is believed advisable to offer one or two definitions or statements of terms. By "straight hole" is meant first a vertical hole. This is perhaps obvious but it has been pointed out in a number of papers appearing from time to time in current magazines that a hole might be started with a certain vertical angle and be drilled to completion with no further angularity and would therefore be technically a straight hole. This hole might be worse from an operating standpoint as well as from the information standpoint than a slightly crooked hole, and certainly would be from the property-line standpoint.

Secondly, it is realized that no hole is ever drilled exactly vertical to its completion. For the purpose of this discussion it is somewhat arbitrarily assumed that a reasonably straight hole is one which in the upper half (3000 to 3500 feet) does not deviate more than two or three degrees from the vertical and in the lower portion the vertical angle does not exceed eight to ten degrees. Anything over ten degrees at the bottom is not believed to be even "reasonably" straight.

It is further considered that to be classed as reasonably straight such deviation as exists should not be continuous in any one direction but should return toward the vertical from time to time and that the rate of change should be gradual, that is there should be no sudden kinks, even if the total angularity be not great. This is the more usual type of reasonably straight hole, and frequently examination of records where complete surveys are available show that the deviation angle of such a hole changes its bearing at different points in the hole so that the course followed may actually corkscrew into a fair approximation of a vertical hole.

Throughout this summary only data regarding the vertical angle of deviation has been considered and all questions of orientation or bearing have been ignored. This course has been followed because of the complete lack of agreement among engineers and operators as to the reliability of many of the survey devices and methods in use insofar as the question of orientation is concerned. It is agreed that vertical angles may be obtained by any one of a number of means with a reasonable degree of accuracy. With these definitions set forth attention may be turned to the data itself.

Principal Factors Affecting the Straightness of Holes

Examination of all the regional reports, questionnaires and published material discloses a number of factors which are almost universally accepted as being of primary importance.

These are as follows:

1. A vertical start.
2. Light weight on the bit.
3. Proper type of bit.
4. Moderate rate of circulation.
5. Mud sufficiently heavy to minimize washing.
6. Concentration of weight adjacent to the bit.
7. Use of oversize or stiffened drill stem immediately above the bit.
8. Use of guides to center drill pipe on hole.
9. Avoidance of rat holing or other unnecessary change in size of hole.

Factors which were covered in the questionnaire but which the majority of opinion relegates to secondary or questionable importance as far as straightness of hole is concerned are:

1. Speed of rotation of drill pipe.
2. The use of casing protectors on drill pipe.

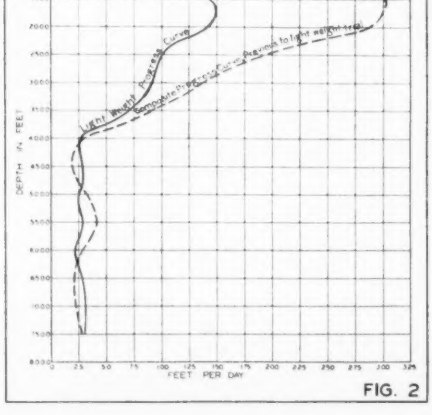


FIG. 2

3. Type of power used.
4. Extra precaution in drilling out cement.
5. Inclination of strata penetrated.
6. Direction of rotation of drill pipe.
7. Hydraulicking action of mud stream.

The general conclusions regarding the factors first listed above will first be outlined, followed by a discussion of some special considerations determined by conditions peculiar to one regional area or another.

1. A vertical start should be assured by

a. Careful vertical alignment of the center of the rotary table with the freely hanging hook.

b. Leveling the table accurately.

c. Use of a fairly long, accurately set conductor cemented in place after being checked for verticularity.

d. Use of large drill pipe, say 8⅝ inch until the first or surface string of pipe is set.

e. Use of some means to keep the kelly joint centered above the table.

The later precaution is by no means universally adopted, being more discussed than followed.

2. Light weight on the bit

Efforts have been made for some time to determine what weight should be used on bottom of various formations and with various types of bits. In spite of the amount of attention given this subject it still appears impossible to set down in tabular forms anything but ranges of weight and even these are open to attack.

Based upon progress studies of over sixty wells drilled by one California operator, it appears certain that much less weight than has been common practice in the past is advisable not only because it gives straighter hole but because it gives as much progress per day on the average and more in some cases. (Illustration—G.P. Progress, Fig. 2)

It is also considered certain that less weight should be used on small bits than on large bits, although this has not been common practice in the past. It would appear reasonable to believe that the weight on bottom should be directly proportional to the diameter of the bit and that limiting weights should be stated in terms of pounds per inch of hole diameter for the various formations and types of bits rather than in points on the weight indicator regardless of the size of hole.

Limitation of the total weight on the bit to 8000 pounds or less during the first 1000 feet of hole regardless of other factors has been recommended by a number of operators. In this connection a California operator has obtained excellent results by the use

of a slip joint on the drill stem just above the drill collar. The device is used with a long heavy drill collar and bit which together weigh 7000 or 8000 pounds, and is so arranged that the driller must support the weight of the drill pipe above the device or circulation will be shut off by the telescoping of the slip joint.

This operator reports that the use of this device made possible the completion of a hole on difficult territory with a maximum deviation of less than two degrees when the offset well drilled by the same company was off twenty degrees by the time a depth of 2500 feet had been reached. (Illustration, Fig. 3). It is further reported that the rate of progress made with the limited weight was "entirely satisfactory."

The Texas-Louisiana section submitted in their report a complete table of correct bit pressures and speed for each type of bit and formation which is here shown as Table one, but data are not available to compile similar tables for formations in other areas or to compute average weights recommended for general use.

Table No. 1

Correct pressure and speed for each type of formation

(Texas-Louisiana-Arkansas District)

	Pounds Per Inch	RPM
Fishtail Bit		
Gumbo	600 to 1000	50 to 80
Shale	700 to 1000	60 to 80
Sand	500 to 700	50 to 70
Rock Bit		
Chalk	600 to 1000	65 to 80
Lime Rock	600 to 1200	60 to 80
Sand Rock	800 to 2000	60 to 70
Hard Formation Core Bit		
Shale	800 to 1000	20 to 40
Chalk	1000 to 15000	20 to 40
Lime Rock	1000 to 1500	20 to 40
Sand Rock	800 to 1200	20 to 30
Soft Formation Core Bit		
Gumbo	400 to 600	20 to 40
Shale	400 to 600	35 to 45
Sand	300 to 500	25 to 40

NOTE: Pressures are given in terms of pounds per inch, that is, the total weight on the bit divided by the diameter of the hole cut.

One California operator reports a tendency for most types of bits to increased in footage drilled per hour with increase in weight up to an optimum weight after which the progress declines from the optimum with further weight increase. Other bits, however, reached no maximum footage as the weight increased and apparently progress could be increased almost indefinitely with increasing weight. These experiments were, unfortunately, conducted without reference to the straightness of the hole drilled. Also these results were based upon progress per hour and not progress per day.

Before leaving the subject of weight on bottom it should be noted that there is almost universal dissatisfaction among engineers reporting on the subject with the weight-indicating devices in present use. Experiments upon the accuracy of such devices when attached to the dead line indicate variations of readings for a known weight of as much as 9000 pounds, and since this is in many cases a very high percentage of the total weight desired to be carried it is obvious that the devices are far from satisfactory.

A California operator reports the kinking of drill collars tested to 16,000 pounds on two occasions when the recorded load on bottom was never allowed to exceed one-half that amount indicating an error of at least 8000 pounds on the indicator.

3. Proper Type of Bit

The general opinion supported by considerable data is that the bit used should:

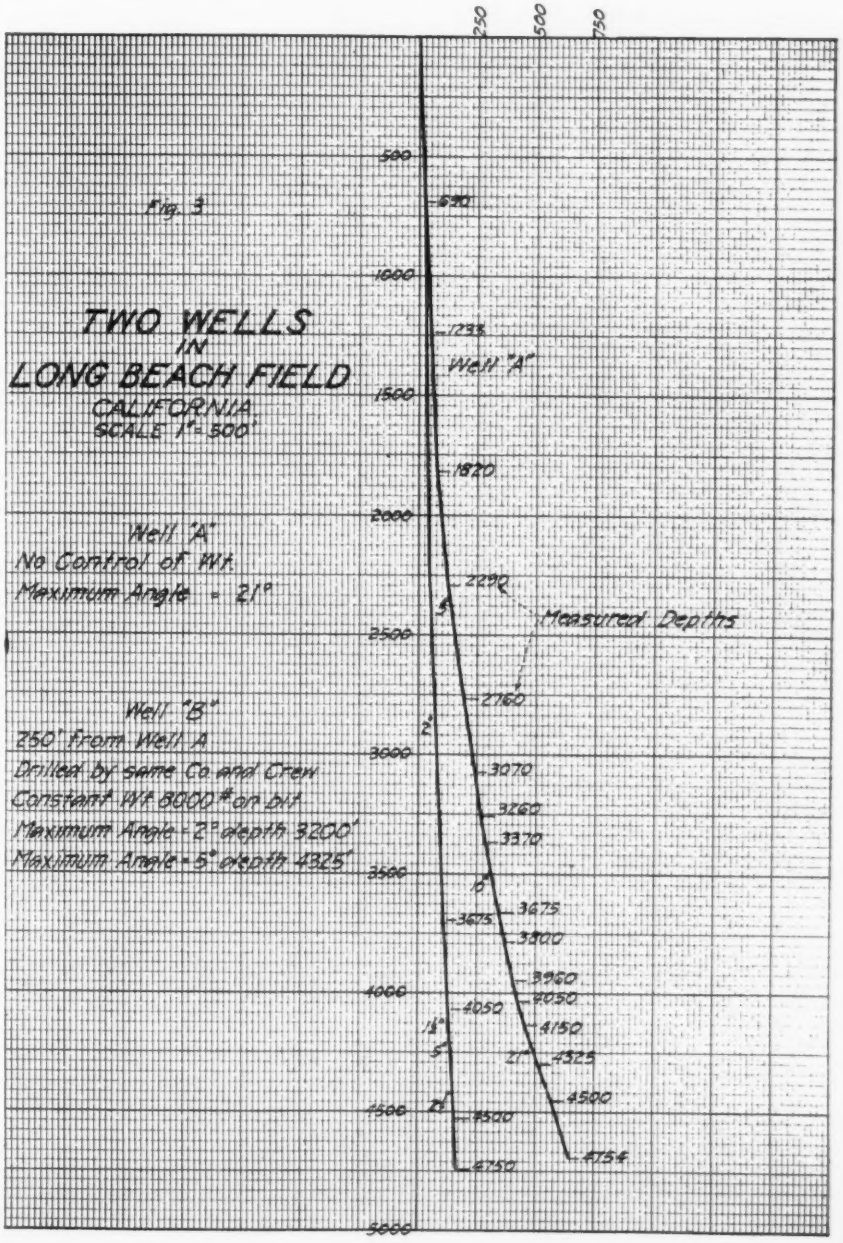
(a) Run concentrically—many bits run eccentrically and tend to cut an oversize hole which would appear to give opportunity for deviation to begin;

(b) Make good footage without excessive weight;

(c) Not wear appreciably out of gauge before becoming dull on bottom;

(d) Be slightly supported on the sides but not cut or reamed as this will tend toward an oversize hole as above;

(e) Be accurately dressed. This refers in particular to bits of the fishtail type which should be dressed to a definite tolerance to say ⅛-inch to avoid one wing leading and thus causing a deviation. A template should be applied to the dressed bit



before it leaves the shop, and bits deviating from the template by more than the established tolerance rejected;

(f) Be reasonably sharp on the cutting edges if of the fishtail type. Many operators are of the opinion that dull bits and recut cones are prolific cause of crooked holes. The question as to when a bit is dull has aroused much discussion. In general it is believed that a bit should be considered dull when moderate progress can no longer be secured without increasing the weight beyond that established as allowable. If a bit ceases to make progress it is either dull or the formation has changed. In any case, in practice, etiquette among drillers is apt to decide when a bit is to be pulled rather more often than not, since it is not considered good form to go off tour with a bit of questionable sharpness in the hole.

It should be noted here that comparative results reported by the Mid-Continent subcommittee on two wells drilled in Seminole County seem to indicate that recut or rebuilt cones contributed to deviation from the vertical;

(g) Have vertical or nearly vertical watercourses to prevent washing an oversize hole.

4. Moderate Circulation Rate

Undoubtedly from a theoretical standpoint the rate of circulation should be proportional to the cross sectional area of the space between the drill pipe and wall of the hole and should give a velocity somewhat greater than the maximum rate of settling of cuttings through the mud. Practically there has not been sufficient attention paid to this detail to warrant any definite statement as to good practice.

5. The mud should be of such a density as to minimize washing with the resultant formation of cavities which will allow the drill pipe to kink and deflect the bit. In this connection it might be noted that the hydraulicking action of the jet is considered to be of distinctly secondary importance except in bits with inclined jet passages.

6. Concentration of weight adjacent to the bit.

A long stiff section immediately above the bit will tend to throw the first point of inflection caused by the long column action of the drill stem higher up the hole. This should reduce the tendency of the bit to wobble and thus enlarges the hole. The concentration of weight at the bottom is believed by many to have a plumb bob effect. This jointly with the next item or

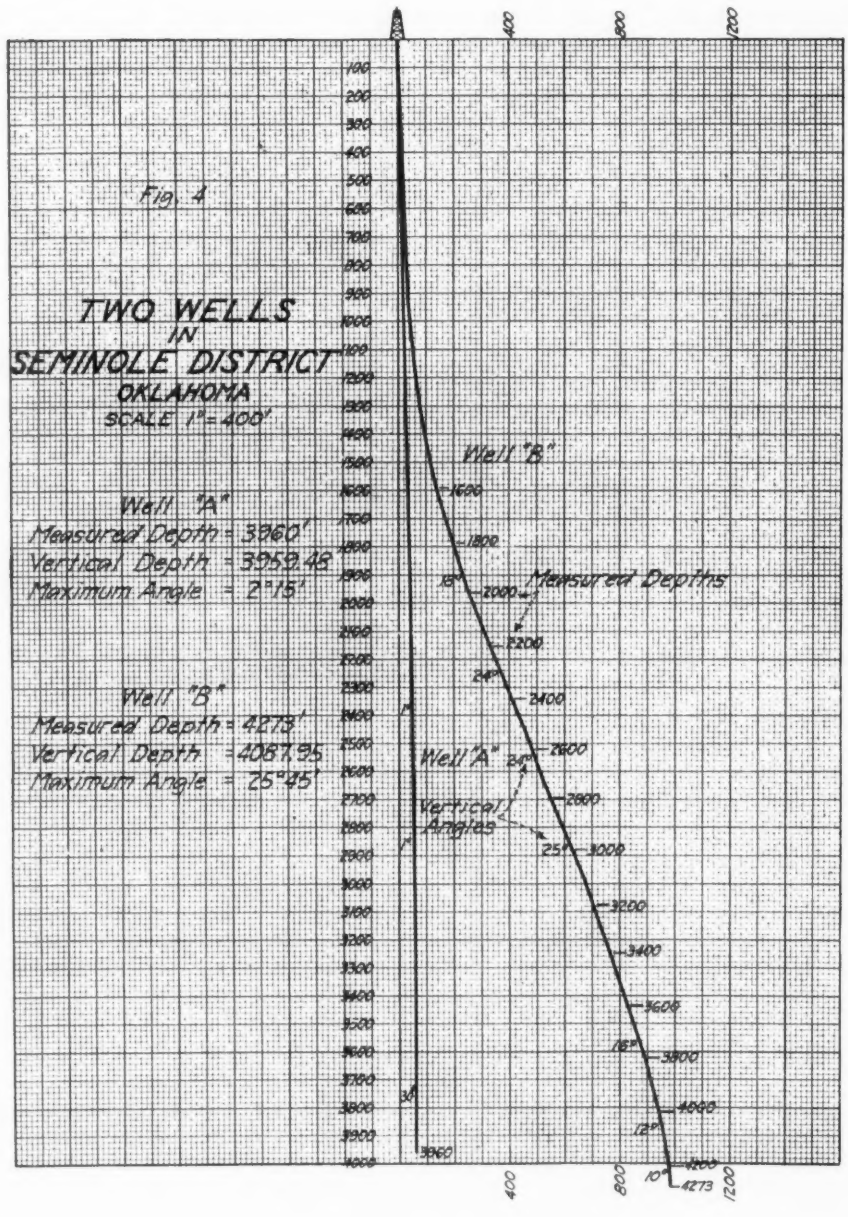
7. Use of oversize or stiffened stem immediately above the bit is at least theoretically desirable and is endorsed particularly by the Texas-Louisiana-Arkansas section.

8. The use of guides to center the drill pipe is enthusiastically endorsed by the Mid-Continent and Texas groups but has not been adopted to any great extent in California where operators are apparently afraid of recovery difficulties if such a device is left in the hole by a twist-off. Advocates of the use of a combination guide and reamer stem above the bit state that in 30 wells only one twist-off was noted. These holes were, however, much shallower than the present 7000 to 8000-foot drilling in California.

By the use of weight limited to a maximum of 11,000 pounds, new cones and a specially designed roller-guide and reamer stem, one well in Seminole County was drilled to completion with a maximum deviation of 2 degrees 15 minutes and a total vertical correction of less than one foot while an adjacent well drilled without controlled weight, with recut cones and without the guide on the drill stem attained a maximum deviation of over 25 degrees and a total vertical correction of over 185 feet in its depth of 4200 feet. (Illustration, Fig. 4).

It is impossible to state what importance should be given to each of the three factors noted but obviously each is desirable may be given some credit for the straight hole.

It might be noted here that the use of protectors on the drill pipe is re-



ported as of distinctly secondary importance as far as straight holes go, as they are of only slight assistance in centering the pipe.

9. Avoidance of rat holing or otherwise unnecessarily changing the size of the hole.

It is almost universally reported that rat holing is to be condemned as there would seem to be a tendency for the small bit to start off center in the larger hole and thus cause deviation. The use of core barrels which cut an undersize hole is likewise condemned.

A major California operator has conducted and is still carrying on extensive experimental work on types of bits using a small experimental drilling rig, drilling in blocks of artificial formation which are later sawed in two to observe the course of the bore. Results obtained are reported to indicate that bits of the diamond-point type tend to deviate from a vertical course when any obstruction or hard layer is encountered and that undersize bits seldom if ever start concentrically within the larger hole.

Of the factors which are given secondary importance at least some are placed in that category because of lack of sufficient data to warrant other action. This statement applies particularly to questions as to: rate of rotation of the drill stem; direction of rotation in its relation to direction of deviation; inclination of strata penetrated; type of power used and character of feed, whether automatic or manual. In the latter connection it was noted that holes which were beyond the reasonably straight limit were reported by California operators using electric drive and automatic feed so that the use of this equipment is not sufficient of itself, to say the least.

The question of the influence of a cement plug on straight drilling is one which called forth a considerable amount of discussion. California operators reported that in general no unusual number of deviations appeared to originate while drilling out cement plugs. This is believed to be due to the common practice of cementing in a shale break when the formation is commonly harder than the cement plug and the bit naturally follows the softer material in drilling out. As a corollary to this statement it is noted that in plugging with cement before redrilling to straighten a crooked hole, satisfactory results are only obtained when the plug is continued up into a soft formation; otherwise the bit follows the old hole.

In the Gulf Coast region it is reported that a tendency is noted for the hole to go crooked below the cementing point unless unusual care is taken in guiding the drill stem. The results in plugging before redrilling are the same as noted by the California group.

Additional papers presented before the American Petroleum Institute at Chicago will be found beginning on Page 65.

While on the subject of straightening crooked holes it might be noted that one California operator reports very good success by backing up to the point where the acid bottle shows the deviation to begin and starting a shoulder by milling with a flared casing shoe in which teeth have been cut. After a shoulder has been cut for some distance drilling is resumed with a regular bit and closely watched to prevent recurrence of the deviation.

Cable Tool Practice

All of the remarks above have been centered on rotary drilling practice. The Appalachian regional group submitted surveys on a number of wells which deserve notice but which cannot be discussed in detail in this paper for lack of time.

Glenn H. Bowlus, one of the country's best known technologists, is engineer of tests for the General Petroleum Corp., subsidiary of Standard Oil Co. of New York, with Los Angeles headquarters. His department sets up specifications governing all equipment used by the General's field and refining organizations

In general it was reported that no one particular formation appeared to cause crooked holes, that in particular "Loose Drilling" should be avoided; in other words, that, to insure a vertical hole, the screw should be fed no faster than the tools proceed. It is of interest to note that spiral stems were not particularly successful in drilling straight holes, the commitee reporting "varying success" with the use of spiral stems.

Conclusion

In conclusion the writer wishes to stress the human element in straight hole drilling. As one engineer has expressed it, the "men employed in the actual drilling must be sold on the idea of drilling a straight hole." No amount of supervision or engineering advice will drill a straight hole. It is the driller who does the job. If his interest, support and cooperation are obtained all will be well. He is the one who knows when the bit is dull or what weight he has been carrying on bottom.

Give him proper equipment, sell him the idea that a straight hole and not necessarily lots of hole is what is wanted, and, with proper supervision and guidance, a straight hole will be drilled.

Second Safety First Contest Planned

TULSA, Dec. 5.—Plans for a safety first contest in the Ponca City-Burbank district, similar to one in the Greater Seminole district last summer, were made recently at a meeting of supervisors at Ponca City. Final details will be worked out in December by a committee and the contest will start Jan. 1, 1930 and continue for three months.

More than 30 departments of oil companies operating in those two districts already have signified their intention of entering the contest, which will be conducted under the auspices of the safety division of the Mid-Continent Oil & Gas Association.

The decision to conduct the contest was reached following a banquet of supervisors at Ponca City the evening of Nov. 22. Ray Miller, secretary of the Natural Gasoline Association of America, and formerly director of safety at the Marland Refining Co., Ponca City, was toastmaster. Talks were made by Elmo Murphy of the Mid-Continent Petroleum Corp.; H. N. Blakslee of the National Safety Council; J. F. Davis of the Bureau of Mines, Vincennes, Ind.; D. J. Wallace, director of safety for the association and H. W. Bogess, of the Sinclair Oil & Gas Co.

They are STILL swinging smoothly

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Wheaton

FAUCETS · VALVES · JOINTS · COUPLINGS · FILLERS · NOZZLES · FITTINGS

THE Chicago convention leaves this department in a contented state of mind. We returned to Tulsa, watching the piled snow along the Sante Fe gradually thin toward the southwest and in Tulsa found very nice weather, indeed. Just right for pastimes like golf.

* * *

The discovery is made that the American Petroleum Institute, and the oil industry, are not so efficient as they would have us believe. During the week in which the A.P.I. was in convention assembled, the Milk Goat Breeders' Association held conference in the same hotel. Between the hours of five and eight ante meridian, the goat magnates used nine tons of ice in cube form. The best the A.P.I. could do was to average about three tons each day. These statistics were gathered from hotel employes by Don Wallace, safety director of the Mid-Continent Oil & Gas Association.

* * *

No one expected to see H. F. Sinclair looking contrite and ashamed after his return from his Washington stay and no one did. His flag is flying quite high and he essays a subtle jest now and then over the affair. One afternoon in Chicago W. L. Connelly, a Sinclair executive, remarked to the "Duke," as Mr. Sinclair is known to some of his organization, that he, Mr. Connelly intended to make a trip to Casper, Wyo. "I just got back from there last week," said Mr. Sinclair.

* * *

Harry F. Brownell, of Sioux Falls, S. D., was present at the Chicago meeting. Mr. Brownell, who built a large marketing business in the Dakotas, has been mentioned as about to yield to the importunities of business men of South Dakota and be a candidate for the Republican nomination for governor in 1930. He would not confirm the report but said that he might have something to say about the first of the year.

* * *

While in Chicago we learned of the death of Emil Steiger, formerly president of the New York Oil Co. He died at his home in Oshkosh, Wis., Nov. 21. He was a leading manufacturer of that region and several years ago the heirs of the late Frank Curtis, who founded New York Oil, persuaded him to give some of his time to conduct of that company. His association with the oil business ceased some three years ago. He became widely acquainted in Wyoming, where the New York did business, and made many warm friends.

* * *

The Pure Oil Co. has opened an office in Oklahoma City, in the Tradesman's National Bank building, from where it will keep tab on western Oklahoma activity and lease trading. L. S. McGee will handle the lease end and D. A. Green will have charge of geological work out of this office.

* * *

The new senator from Wyoming, Patrick J. Sulliva, who was appointed to fill the place of the late Senator Warren until an election can be held, has been identified with the oil industry of that state. He is reputed to have made a considerable part of his fortune in the Salt Creek field. He has been in Wyoming since 1888.

* * *

Foster B. Parriott, president of the Transcontinental Oil Co., was the donor of a $75,000 organ to the First Methodist Church, of Tulsa. Dedication ceremonies for the organ were held recently. It was dedicated to the parents of the oil man, the Rev. and Mrs. George Wilson Parriott, deceased.

* * *

William F. Chisholm, director of the minerals division of the Louisiana conservation commission, resigned Dec. 7. This followed closely the resignation of the conservation commissioner, Dr. V. K. Irion. Mr. Chisholm said that he had been offered a better position in another line of work.

* * *

Guy Danielson, of the Chicago Pneumatic Tool Co., has left that company to give full time to the Braurer Tool & Machine Co., in which he has an interest. He will live in Oklahoma City.

* * *

In a letter to this department, Ellick Botts, popular ex-pumper of the Gray Horse district, comments on the assertion made from time to time that the industry needs a dictator. Says Mr. Botts:

"I have heard here and there that Calvin Coolidge is being mentioned for czar of the oil industry. Now, I do not believe that would do a bit of good. I have a real plan.

"Scarface Al Capone will be at liberty soon and seeking a situation. I understand that his old job in Chicago has been filled by Mr. Bugs Moran.

"Mr. Capone is just the man the industry needs. He would establish a system of fines and demerits that would speedily iron out all our troubles. Suppose a filling station man cut the price of gasoline under that of his competitor. Mr. Capone would merely call and say, 'Listen, bozo, up with that price or you get a pineapple.' That would be extended also to top leasers, people who broke shutdown agreements and the like.

"He would likewise protect the industry from its foes outside. Suppose a state legislature grew frisky and started in to increase taxes. Al would merely notify the boys that all who failed to vote against the measure would be visited by the machine gun squad.

"I should like to see a special meeting of A.P.I. directors to consider my suggestion. No charge for this advice."

* * *

Ernest J. Nicklos, vice-president of the Continental Oil Co., in the November number of the Conoco Magazine, official company publication, gives some suggestions to his field men on reducing lifting costs. The settled production, he says, is "our bread and butter" and must be carefully watched to insure profits.

"Many items affect our lifting costs," he says, "such as wages, fuel, taxes, teaming and trucking, supplies, depletion and depreciation. This expense can be substantially reduced by moving every piece of surplus material off our properties, thereby eliminating charges for depreciation against such material. Every pumper should see that not a single piece of equipment, tools or material, is found on his lease which is not essential to operation.

"The pumper who maintains his powers, engines, buildings, rod lines and jacks, in first-class condition; who watches his small tools, supplies and lubricants and many other items; who has gas tight tanks with hatches closed stuffing boxes without leaks; who re-

moves all fire hazards and conditions which may cause personal injuries, will always be able to show the greatest efficiency and lowest lifting cost, and, it follows, more uniform production. . . .

"Pollution of properties is an evil which must be constantly watched and avoided. One lawsuit from this cause can wipe out the profits from several months production, and, consequently, affect our lifting costs, not only on some particular lease but for this department as a whole."

* * *

Wichita, Kans., has a police officer named Lon Fugit. He is supposed to be distantly related to the well known Tempus.

* * *

Wayne Rice, former superintendent of the Marland Refining Co., Ponca City plant, has resigned as superintendent of the J. S. Cosden & Co. refinery at Big Spring, Tex., which position he has held for the past year.

* * *

P. J. Hegwer, of the U. S. Geological Survey office in Tulsa is spending a vacation period in California.

* * *

In Enid, Okla., the status of H. H. Champlin, oil man, as a banker has been enhanced. The First National Bank, of which he is president, has purchased the American National. Combined resources of the two exceed $3,500,000.

* * *

Willis C. Brown, widely known among oil men of the Mid-Continent, is now vice-president of the Warner Motor Co. (aviation), of Detroit. Mr. Brown for several years was Tulsa district manager for the Foxboro Co., Inc. He spent his spare time working out plans for airplane construction, embodying several original ideas. The result was the organization of the Spartan Aircraft Corp., of which he was president, and the construction of one of the largest plants in the southwest, in Tulsa. He resigned this connection some months ago.

* * *

Four Okmulgee oil producers, Bert Wigton, Ralph Viersen, O. L. Long and Mark Hill, made a successful hunting foray into southwest Texas. Result: four deer and five wild turkeys.

* * *

Died: In Winfield, Kans., Joseph Moncrief, of the producing firm Thomas & Moncrief. He was 55 years old.

* * *

C. E. Riley has been made general manager of the Burk Divide Oil Co., Burkburnett, succeeding O. L. Soules, who was recently killed in an automobile accident near Burkburnett. Mr. Riley has been with the company for 10 years and had supervision of Burk Divide's development in the Red River bed area.

* * *

Amarillo's newest addition to the group of splendid office buildings has been completed and occupied. It is a 14-story structure built by the Santa Fe railway.

* * *

Banquet sponsored by the National Safety Council and the Mid-Continent Oil & Gas Association was held the evening following Thanksgiving Day in Ponca City. Oil company superintendents and foreman from the several oil towns in the district attended. Gen. Baird H. Markham, assistant to the president of the Continental Oil Co., was toastmaster.

At the moment there is no group of company executives in the Mid-Continent with less idle time on their hands than the quartet shown here. They have to do with roundly 100 operations in the Oklahoma City field. All are of the Indian Territory Illuminating Oil Co. Left to right, George V. N. Yates, superintendent of pipe lines and storage; Arthur V. Hoenig, vice-president in charge of production; M. J. Kirwan, manager of production and D. B. Dow, chief engineer

In this department last week a serious error was made in publishing a sketch of the photographic trials and tribulations of W. G. Skelly. The last part of the sketch was run at the beginning of the page and the first part was run elsewhere, all of which goes to show that Mr. Skelly is not the only one who has his troubles.

The reader may now pause to shed a tear for the conductor of the department whose choice humor is manhandled by the printers. In an effort to restore partially Mr. Smith's peace of mind we republish the sketch below as it should be (we hope.)—Editor.

* * *

Since the Skelly Oil Co. completed the addition to its building, at least on the outside, this department will be able as never before to keep in touch with local events. In fact, it will be possible to be a day or so ahead of the newspapers.

William G. Skelly, president of the company, is one of those individuals that everyone picks on to do the running of various movements. In consequence, he is forever being interrupted at his work and dragged out before a camera. The new roof on the building, being flat and affording plenty of light, is a swell place for the photographers to ply their trade.

Mr. Skelly is very good-natured about it all, having a patience born of the long and futile struggle to get a few hours to himself. He merely sighs a little when his secretary tells him another camera man is waiting outside, takes his stance and puts on an expression of extreme pleasure, which he does not always feel, by any means.

That roof is almost on a level with our window, just across the alley. Thus, we are right in on whatever big city or nation-saving event is in progress of fabrication. Is the Republican party in need of the pulmotor? National Committeeman W. G. Skelly must be yanked away from the contemplation of the company balance sheet and posed.

Does aviation require a boost? Airplane Manufacturer William Grove Skelly must be found and compelled to say a few words, with picture.

How about the International Petroleum Exposition? President of same, Skelly, does the expected boosting. And so it goes, entertaining big railroad men, bankers, Kickapoo chiefs, oil men, etc. They did spare him on the day that some moving picture company's pet lion was paraded through the streets, but that was not oversight. Mr. Skelly was out of town.

One expects him just any day now to turn suddenly and start smashing cameras right and left. We shall watch the roof faithfully for just that happening.

Oklahoma City Field One Year Old; Has Produced 6,808,000 Bbls.

By John Power
N. P. N. STAFF WRITER

TULSA, Dec. 7

PERHAPS out of deference to executives absent in Chicago, the Mid-Continent passed a singularly quiet week. Even the Oklahoma City pool did nothing spectacular, in spite of the fact that it had Dec. 4 to celebrate as its first birthday.

Possibly the outstanding well of the week for Oklahoma was a wildcat showing good for possibly 500 barrels daily in the Misener sand encountered in Noble county. For Kansas a wildcat in northern Sumner county aroused some interest although most of the light continues to be turned on the Voshell pool of southern McPherson county. The Texas Panhandle featured a quarter mile extension of the Finley pool, Gray county with a well averaging 225 barrels per hour the first 24 hours it produced.

Although a rank wildcat, the Magnolia Petroleum Co.'s No. 1 A. Young, in the NE NW NW of 22-21N-2W, Noble county has not attracted the attention it might have had its strike been in a different sand. Operators in general have rather lost compression on the Misener sand, in which the well's production was encountered.

The sand was topped at 5100 feet. At four feet in the well started flowing by ten minute heads at hour and a half intervals. No pipe line connections have been made for the oil, which is 42 A.P.I. gravity. The well is shut in, and pipe is being run to give the formation a thorough chance to prove itself. The Misener is not highly regarded as a producing formation due to its general inability to hold up for any great length of time.

December 4, 1928, the Indian Territory Illuminating Oil Co.-Foster Petroleum Corp. drilled in their No. 1 Fee, in the center of the southeast 40 acres of 24-11N-3W for an initial production of close to 5000 barrels per day. In addition to opening a new, and undoubtedly major pool, the well was the state's deepest producer, being bottomed at that time at 6355 feet.

In the year that has elapsed since then the area opened has assumed its position as the state's most important single oil field. Every effort has been made to retard the development of the field in order to keep it from flooding the market, and to make possible an orderly and economic development of its resources. And that the principles involved in bringing about orderly development have made great strides since the Greater Seminole area was developed is evidenced by the statistics of the field.

To date 40 wells have been completed as producers, two as failures. Restriction agreements are keeping half of these producers shut in, and holding the field to a daily average for the past week of 72,525 barrels. The estimated potential production of the pool from completed wells is now 276,000 barrels.

The derricks of 170 operations now surround the discovery well. Of these 15 are rigs either built or building, and 155 are drilling wells. Sixty of them are working at depths of 6000 feet or more.

To date the field has had a cumulative production of 6,808,000 barrels, of which the discovery well has produced something over a million barrels. Water recovery from the nearly 20 wells in which water has made its appearance amounts to some 45,000 barrels daily. Total outlet from the fields at this time is 166,000 barrels with an additional 20 barrels expected to be available before long.

The continued and growing encroachment of water in the main body of the field, frequently discussed in these and other columns in NATIONAL PETROLEUM NEWS, has caused many production men to incline to the belief that the real economic importance of the field in the not so distant future will lie in the sand production which has been found along the west and south flank of the pool.

SKELLY OIL CO. in its well in the NW NE of 31-11N-2W, on the southeast flank of the pool, has cored a large sand body, stopping only after encountering a hard, impervious strata below which it was thought water might lie. This well, closely watched as any in the field, is to be drilled in next week, and may shed some light on the trend of production in this direction. A goodly portion of the sand which contained gas has been cased off.

Aside from the pool's unusual depth it has also turned in the state's two largest wells ever, one of which made nearly 43,000 barrels actual gage, and the other, a more recent completion in the NE of 24-11N-3W making 36,055 in 24 hours.

In Kansas the Voshell area of southern McPherson county continues to be the most active of Kansas plays. The latest addition to the producing wells, bringing the total to five, is the McBride et al. No. 2 Voshell, in the SE NE NE of 9-21S-3W. It has a hole full of oil from the Wilcox at 3305-10. It does not extend production as it is directly between two other producing wells.

THE Derby well, stellar producer of the field continues to swab and flow some 1200 barrels of oil daily. No water has as yet made its appearance.

Western Kansas continues to bat right along with its exploration work, occasionally rewarded by a completion of sorts. The latest of these is the Phillips Petroleum Corp. No. 1 Wigle, in the NE of 19-12S-17W. It appears to be good for 200 barrels per day natural. The production is coming from the upper pay topped at 3680-86.

This new producer is two miles southwest of the Shutts two-well-pool, also opened by the Phillips several months ago.

Although regarded somewhat skeptically because it is producing from the unreliable chat formation a wildcat strike of the Slick, Pryor and Lockhart and Darby interests in northern Sumner county may bring on some activity in that section.

The well is the No. 1 Peasel, NW of 33-31S-1W, four miles northwest of the town of Wellington. Estimated as good for all the way from 500 to 1000 barrels per day initial, the well is awaiting storage and pipe line facilities before being opened to full production. It flows rather weakly and sporadically when unassisted, but has made as much as 65 barrels per hour when swabbed. The chat is reported as topped at 3675.

The well of the week for the Texas Panhandle is one which extends the Finley pool of Gray county a quarter mile to the northeast. It is the Phillips Petroleum No. 6 Palmer, in the NE of section 31, Blk. B-2, H. & G. N. survey. The well made 350 barrels the first hour it was in, to-

taling 4755 barrels for the full 24 hours. Pay was encountered at 2805-35.

The Panhandle as a whole showed little change during the week. Three more wells were added to the area's total, and 1350 barrels to the daily average output for the week. The area averaged 110,660 barrels per day from 1721 wells.

* * *

Notes on the Week

Proration continues to hold the total output for the state to a figure closely in line with what the majority of the oil men want it to be. For the week just ended it was 654,-340 barrels.

Skelly Oil Co.-Independent Oil & Gas Co. No. 1 Elrod, NE SW of 31-19-4W, in the southern end of the Roxana pool of Logan county does not make that part of the field look too promising. Although it has a hole full of oil at a total depth of 5825, it is running 71 feet lower structurally than the Shell's No. 1 Story on the north.

* * *

With the east Earlsboro pool considered fairly well defined on the north, east and south, the field now has 80 wells completed, 44 wells drilling below 3000 feet, and 27 wells drilled in and shut in for proration.

Dimit Elected Vice President Of Independent O. & G. Co.

TULSA, Dec. 7

FOUR changes in the executive personnel of the Independent Oil & Gas Co., following the resignation several days ago of E. H. Moore as president, have been announced by the executive committee of the board of directors.

R. B. Pringle, vice president and general manager, has resigned effective Dec. 5 and will be succeeded by Charles P. Dimit, formerly of the Gypsy Oil Co. At the same time Villard Martin, vice president in charge of marketing, resigned and will be succeeded by O. L. Cordell, who prior to his resignation five months ago was vice president in charge of marketing.

Mr. Pringle has announced that he will devote a portion of his time to a company in which he is interested and which is now operating in the Seminole district. Mr. Martin will return to his law firm of Ramsey, DeMeules, Martin & Logan, with whom he was associated for 13 years prior to joining the Independent's executive staff last March.

Mr. Pringle came to Tulsa in 1914 for the National Supply Co. He joined the Waite Phillips Co. in 1918 when he was made a vice president. He remained with Mr. Phillips, who at present is chairman of the board of the Independent company, until the Waite Phillips company was sold to the Barnsdall Oil Corp.

Mr. Pringle and Mr. Cordell, who also had been associated with Mr. Phillips, formed the Alamo Refining Co. at Borger, Tex. The plant later was sold to Phillips Petroleum Co., and when the Phil-Mac Oil Co. was merged with the Independent Oil & Gas Co. about two years ago and Mr. Phillips became chairman of the board, Mr. Pringle became vice president and general manager.

Mr. Martin was for several years closely associated with Mr. Moore and was a member of the board of directors prior to his election to a vice presidency last March. At that time he was in charge of the legal department, but when Mr. Cordell resigned as vice president in charge of marketing Mr. Martin assumed those duties.

Both Mr. Dimit and Mr. Cordell are well known in the oil industry. Mr. Dimit started in the material department of the Gypsy Oil Co. in 1910, was appointed purchasing agent in 1916, and later was made general superintendent in charge of production, and in 1922 was placed in charge of all operations with the exception of the pipe lines.

Mr. Cordell after disposing of his interest in the Alamo Refining Co. joined the Phillips Petroleum Co. and organized the marketing department and was in charge until he resigned to join the Independent company.

C. P. Dimit

R. C. Sharp, who succeeded Mr. Moore as president of the company, announced Dec. 7 that the election of Messrs. Dimit and Cordell completes the full organization of the company. The executive committee now is composed of Waite Phillips, chairman of the board; R. C. Sharp, president; C. P. Dimit, vice president in charge of operations; O. L. Cordell, vice president in charge of sales; Gillette Hill, vice president in charge of land department; J. M. Wadsworth, vice president in charge of refining; John E. Curran, secretary and legal department; R. M. Riggins, treasurer, and M. H. Massey, assistant secretary and treasurer.

Members of the board of directors as now constituted are, Messrs. Phillips, Sharp, Dimit, Cordell, Hill, Riggins, Curran, J. M. Wadsworth, E. H. Moore, R. B. Pringle, R. Otis McClintock, Don M. Kelley, E. P. Currier, Henry Lockart Jr., A. R. Jones and E. W. Goebel.

Mr. Dimit is to be succeeded as general superintendent at the Gypsy by S. G. Sanderson, who has been Mr. Dimit's assistant during the past 18 months.

Mr. Sanderson joined the Gulf organization 16 years ago. He started in the natural gasoline department. In 1917 he was put in charge of the gasoline plants of the Gulf Refining Co. of Louisiana, where he remained until 1919. In 1919 he was put in charge of the Gypsy Oil Co. gasoline plants. A year and a half ago he became general assistant to Mr. Dimit, all phases of production being included in his work.

Gas Turned Into Mains At San Francisco

LOS ANGELES, Dec. 5.—Buttonwillow gas fields were connected with San Francisco and other Bay cities on Nov. 21, when Pacific Gas and Electric Corp.'s pipe line running from Buttonwillow through Kettleman Hills to San Francisco was completed.

The main was tested under a pressure of 350 pounds and found leakproof, and as the eight Milham Exploration Co.'s wells at Buttonwillow have been connected to the pipe line it is expected that San Francisco will be entirely supplied with natural gas within a short time.

It is estimated that Buttonwillow could supply nearly 100 million cubic feet of natural gas per day at present and with the completion of other wells could double this amount. The heat value while not as good as that of the gas from Kettleman Hills is still far superior to manufactured gas.

Here's What 5-Point Pipe Means In Cooling Tower Savings—

A large oil refinery (name on request) constructed a cooling tower of Reading 5-Point Pipe, using also a small section of ordinary pipe. The 5-Point Pipe had previously been used for 18 months as well tubing, while the ordinary pipe had seen only three months of such service. At the end of fifteen weeks, the section of the tower made of ordinary pipe had to be junked because it was so badly corroded. At the end of ten months, the Reading 5-Point Pipe showed no sign of corrosion—there was no formation of rust or scale to impair cooling efficiency, even though raw creek water was used as a cooling medium!

Such service is common with Reading 5-Point Pipe because it is made of corrosion-resisting Genuine Puddled Wrought Iron—double-welded for extra strength. Get the benefit of its remarkable savings—insist on getting Reading Genuine Puddled Wrought Iron Pipe.

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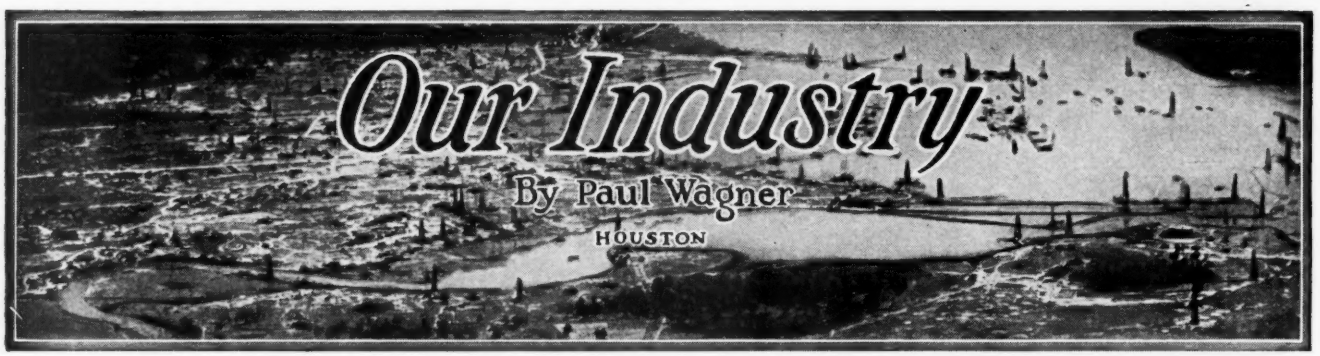
As an added improvement all Reading Galvanized Couplings for Reading 5-Point Tubing are now furnished with galvanized threads.

GENUINE PUDDLED WROUGHT IRON
READING PIPE
DIAMETERS RANGING FROM ⅛ TO 20 INCHES



UNIFIED development in the new Van field, discovered by Pure Oil Co., in Van Zandt county, East Texas, will not prevent the drilling of perhaps 100 wells in the next year and a half. The wells to be drilled will be necessitated by terms of leasehold requirements. Methods of economic wastage, brought about by competitive line-drilling of unnecessary locations, however, will be eliminated.

All operators in the field have now attached signatures to the contract, whereby Pure Oil Co. will be in charge of the field; Bass & Dillard and Carl Short will carry on drilling work; and Van production will be divided among leaseowners on a percentage basis.

Until November, 1931, Pure Oil Co. will receive 80 per cent of the oil produced in the Van field and 20 per cent will be divided between The Texas Co., Gulf Production Co., Shell Petroleum Corp., Sun Oil Co., and Humble Oil & Refining Co., in proportion to their acreage holdings in designated territory. At the end of two years, a committee of engineers will fix a new allotment based on field values to be ascertained by development results. Then a new operating contract to run for an additional five years is proposed.

Equipment for Van field development will reach the territory via the Texas & Pacific railroad at Grand Saline, north of Van, and shipments of crude will be made to the Pure's Smiths Bluff refinery, on the Gulf Coast, via the Cotton Belt. Companies party to the contract will receive the market price for their share of the production, less a uniform charge against their barrelage for recovery costs, or they may elect to receive their crude in their own tank cars at Chandler, on the Cotton Belt, pending such pipeline construction as may be made in the future.

Leaseholds consolidated for Van field unified operations total 5800 acres in all directions from the Pure's Jarman discovery well, which continues to average about 260 barrels daily.

* * *

L. G. Metcalf of the Union Oil Co. of California is now a member of three general committees of the American Petroleum Institute, succeeding Ralph J. Reed, also of Los Angeles. He is on the general committees on fire prevention, corrosion and oil pollution. Mr. Metcalf's appointment followed Mr. Reed's resignation from the Union several months ago.

* * *

Paul L. Applin, who conducts land and geological work for the Cosden Oil Co. at Fort Worth operating headquarters, was for years connected with the Rio Bravo Oil Co., Southern Pacific subsidiary, at Houston, before taking his present position. He has represented J. S. Cosden for several years, taking an active part in that operator's West Texas activities from their inception. His wife, Mrs. Esther Richards Applin, also formerly of the Southern Pacific organization, is a noted paleontologist of the southwest.

* * *

E. McCune of the land department, Sun Oil Co., Dallas, is widely known in oil industry circles of the southwest. In addition to his other activities in connection with the Sun's land affairs considerable of his time is devoted to taxation problems. Mr. McCune has been a member of the Sun organization for many years.

W. H. Lyne, Jr., who for many years was connected with The Texas Co., in Gulf Coastal Texas and northern Mexico, now has charge of the Continental Oil Co.'s producing property in the Aztec republic. Its producing property consists of "El Limon" hacienda, approximately 50 miles west of Tampico, taken over from the old Marland Oil Co. of Mexico. Geological work in the region comes under J. L. Tatum, now located at Laredo, Texas, who divides his time between the territory lying north and south of the Rio Grande. Besides "El Limon" production, the Continental owns hundreds of thousands of acres of leaseholds and federal "denouncements" in Mexico.

* * *

Len Walker, production superintendent in the Goleta division of the Pacific Western Oil Co., Los Angeles, is recovering from an operation recently performed at a Long Beach hospital.

* * *

Oil or gas explorations cannot be made on extensive state lands belonging to the Texas prison system until the legislature enacts a new law authorizing execution of leases, in the opinion of Assistant Attorney General

Paul L. Applin

E. McCune

L. C. Sutton at Austin. A recent law reorganizing the prison system omitted the previously existing statute under which old leases were made. The Texas prison board has advised the attorney general's office of the receipt of inquiries from oil companies with regard to leasing parts of the 74,000 acres under its control.

* * *

F. C. Jones, recently promoted to be head of The Texas Co.'s refinery accounting division at Houston, has been identified with that corporation's affairs for 19 years. E. M. Lansford is assistant department agent and D. R. Hollis is chief accountant.

* * *

A. B. Cox, now of The Texas Co. (Australasia), Ltd., formerly was superintendent of terminals of The Texas Co., with New York headquarters. His transfer to Sydney was made about six months ago.

* * *

W. D. Brookover, production vice president of the Panhandle Refining Co., has returned to Wichita Falls after visiting Mrs. Brookover, who is seriously ill in Arizona.

* * *

The consolidation several months ago of the Marland Oil Co. of Delaware and the Continental Oil Co. of Maine into the present Continental Oil Co. of Delaware brought into the new organization certain wildcat properties south of Vienna, in Austria. John C. Nicklos is in charge of the European operations mentioned. A test well started in March, 1929, with 20-inch surface casing, is now drilling below 2550 feet.

* * *

"The men with the desirable places in all industry," in the opinion of C. P. Gunn of The Texas Co.'s Port Arthur Works, "are the men who have stayed with the job and who have been able to accept discipline with the same grace as they have accepted advancement. . . . Young men should scan the industrial horizon with a view to learning just what is in the future for them, and if they are observant, this one thing will stand out prominently before them like a mile-post pointing their route."

* * *

The Munger-Wilson Oil Co. has been formed by Abilene men for the testing of the Page ranch in Sleicher county, Texas, south of San Angelo. George T. Wilson is president and L. S. Munger vice president of the company. The test is in sec. 40, block L. of the GH&SA railroad survey, nine miles southeast of Eldorado.

* * *

Frederick F. Doyle is manager of the new natural gas division of the Pacific Gas & Electric Co., San Francisco. His first work in the industry was as a field engineer in the Hogshooter district, near Bartlesville, Okla., where he worked for the Kansas Natural Gas Co., in 1912. Later, he became superintendent of the mine

W. R. Lake

compressor stations then maintained by that company. He went to California, with the Midway Gas Co., in 1916.

* * *

W. R. Lake, who represents the Emsco Derrick & Equipment Co., in West Texas, makes headquarters at Midland. He works under L. R. McCollum of Dallas, general manager in the southwest of the Emsco and affiliated companies, which include the D. & B. Pump Co. unit of the group. Mr. Lake is widely known in southwestern sales territory.

* * *

Dr. M. R. Gutsch, faculty secretary of the University of Texas, is authority for the statement that a department of petroleum engineering is to be recommended for establishment by that institution. It is proposed to establish a professorship with the appointee acting as chairman of the department, which would come under the present College of Engineering.

Members of a committee investigating the proposal included Dr. E. H. Sellards, associate director of the Bureau of Economic Geology; Dr. F. L. Whitney, professor of geology and paleontology; Dean T. U. Taylor of the College of Engineering; E. P. Schoch, director of the Bureau of Industrial Chemistry; and H. T. Parlin, dean of the College of Arts and Sciences.

* * *

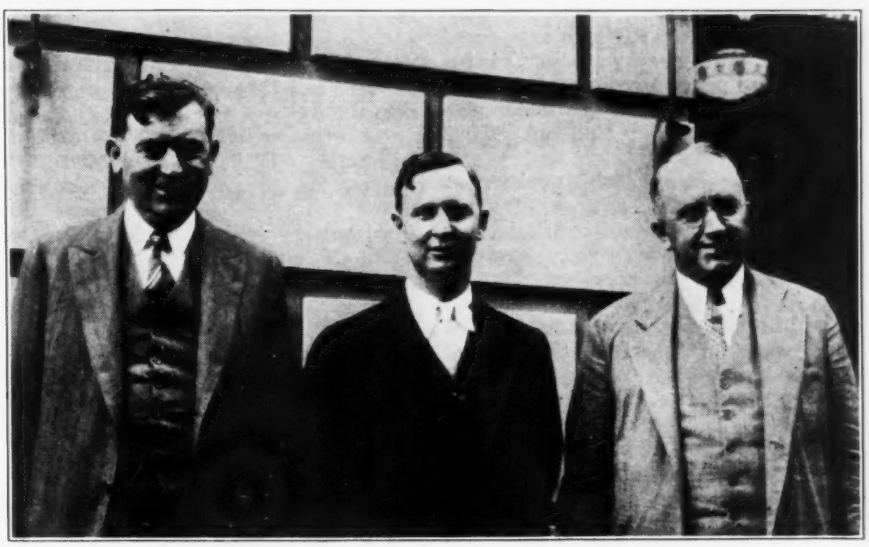
David Donoghue of the executive staff of the Tidal Oil Co. has returned to this country after a business trip to Tampico in connection with affairs of the parent Tide Water-Associated Oil Co. Although occupying the position of executive assistant to President Ed. H. Salrin of the Tidal Oil Co., of Tulsa and New York, Mr. Donoghue continues to make personal headquarters at Fort Worth for the present.

* * *

K. C. Baker, president of the United North & South Development Co., has purchased the E. J. Altgelt estate of 138 acres, nine miles north of San Antonio on the Fredericksburg road, for a consideration said to have been $152,000. Mr. Baker plans to make the property his home.

* * *

An accompanying group picture taken at a southwestern production engineering conference shows three Houston men widely known in Gulf Coastal territory. From left to right are M. (Bink) Manning, assistant general superintendent of the Gulf Coastal producing division, Humble Oil & Refining Co., Houston; W. T. Doherty of the Humble's headquarters engineering staff; and M. C. McDowell, general production superintendent of the Rio Bravo Oil Co., Southern Pacific subsidiary at Houston. All are active in American Petroleum Institute standardization and production engineering work.



M. Manning, W. T. Doherty and M. C. McDowell

Proration Makes Substantial Progress In Flush California Fields

By Jack N. Westsmith
N. P. N. STAFF WRITER

LOS ANGELES, Dec. 6

EVEN though production in California showed a substantial increase during week ending Nov. 30, operators are confident that they have the problem licked and that by the first of the year overproduction on the Pacific Coast will be a thing of the past.

Notwithstanding this optimistic viewpoint, there are several critical areas that will have to be watched carefully. Santa Fe Springs has approximately 96 wells that will be in position to be completed between Dec. 1 and Jan. 15. A large part of these wells are on the crest of the structure and under favorable conditions will be completed in the Clarke zone for from 4000 to 8000 barrels.

Elwood Terrace, on the coast northwest of Ventura Avenue, is now producing about 32,000 barrels, or about 2000 barrels in excess of the figure fixed for the field. Moreover, the producing wells are now pinched back to very near the limit so that new completions will cause the field to show an excess if additional wells are completed.

By agreement between operators, six wells will be completed and placed on production between Dec. 1, 1929 and Feb. 1, 1930. Of these six wells one, Luton Bell, was completed Dec. 3 for 4000 barrels from a depth of 3409 feet. The well made about 13 million cubic feet of gas until the tubing was lowered nearly 200 feet, after which the gas production dropped to 5 million cubic feet.

In his first order on the Elwood field, Umpire Paul Grimm announced that the daily average potential for the field during December was 44,000 barrels and set an allowable production over this period of 30,000 barrels.

In order that oil field workers at Elwood should not suffer as the result of this curtailment of drilling operations, the operating companies have adopted the plan of keeping their regular field men employed on a four to five day a week basis. The employees having their wages reduced proportionately.

Perhaps the most encouraging development during the past week was the action taken by operators in the Ventura Ave. field.

On Nov. 30 the field was estimated to have had an output of approximately 285 million cubic feet of natural gas and 65,800 barrels of oil. Immediately following the appointment of Paul Grimm as umpire for the field the operators commenced to pinch in their wells so that on Dec. 5 the field's output was estimated to be 161 million cubic feet of gas and 50,300 barrels of oil. Although this latter figure may be a trifle conservative, nevertheless the operators are cooperating as is shown by the fact that 64 wells were killed because of high gas pressure.

Shell Oil Co. killed 29 wells, Associated killed 25, and General Petroleum Co. and Pacific Western Oil Co. killed 5 each. With these wells shut in the oil-to-gas ratio for the field is only a little over 3500 cubic feet per barrel of oil, as compared with about 4500 cubic feet per barrel of oil, a week ago.

Under the provisions of the order issued by the board of commissioners acting at Ventura Ave., operators may produce as much oil as they like provided that they do not waste more than 10 per cent of the total gas outlet for the field. This outlet is estimated to be 150,000,000 cubic feet at present, so that the 161 million cubic feet is not excessive.

AT A meeting to be held Dec. 12, operators in the Santa Fe Springs will decide a number of important questions pertaining to future development in that field for the next 90 days. If drilling is suspended, as is contemplated, for 60 to 90 days, nearly 3600 oil field workers will be thrown out of work. To avoid this the operators will study methods of orderly drilling, so that curtailment will proceed without interruption and at the same time the workers will not suffer.

An attempt will also be made to bring the oil companies, particularly the larger ones, around to the point where they will assist in preventing the unreasonable waste of gas. This action is being taken to prevent possible action on the part of the state.

Long Beach has been definitely curtailed and further trouble is not expected. The daily average production from that field for week ending Dec. 6 was estimated to have been 104,000 barrels per day, or only 4000 barrels in excess of the allowable figure. New completions barely offset natural decline and cooperation of operators has caused the daily output to be reduced steadily.

Development work in the flush fields has been delayed as a result of curtailment plans and it is only in wildcat or semi-wildcat areas that interesting discoveries are made.

Oscar Howard, Independent operator at Santa Fe Springs, has suspended operations on his Hathaway 7 at a depth of 9053 feet, although reported to be in rich oil sand. No production test will be made at present, as a successful completion from below the 9000 foot horizon might upset proration plans at Santa Fe.

DEVELOPMENTS in the San Joaquin Valley attracted the attention of California operators again during the past week, due to the discovery by Keystone Petroleum Co. of considerable gas in its wildcat on section 18, 28-32, southeast of the Lost Hills district, in Kern county.

Although no oil sand has been penetrated down to the present depth of 3183, operators are sure that oil will be found at or near the 3500-foot level. Gas pressure was so heavy that it was necessary to pump in 30 tons of baroid in order to continue drilling.

This location is in the same section that Zurich Oil Co. drilled a test well several years ago, which was abandoned due to mechanical difficulties that made further progress impracticable.

George F. Getty has just spudded in its tideland well 120-1 on the coast at Carpenteria where an attempt will be made to find oil beneath the ocean floor. This test is located only a short distance from Continental Oil Co.'s tests, the Franklin 1 and Baillard 1, both of which have been abandoned. Continental will make a test of the ocean floor within the near future on tideland permits adjoining Franklin and Baillard properties.

Standard Oil Co. is drilling ahead in its well 11p-81 in the Kettleman Hills following the recovery of the tubing that resisted all efforts to be removed for several weeks. Standard is deepening its well, which was allowed to be completed under the agreement curtailing production at Kettleman Hills for two years, to a lower producing horizon. When completed several weeks ago, the well made only 1000 barrels of high gravity oil per day, as compared with an initial output of 7000 barrels obtained in Continental Oil Co.'s 12-8 from the lower level.

On the Western Front

By Jack N. Westsmith
Los Angeles

AT A recent meeting, directors of the California Oil and Gas Association nominated Herbert R. MacMillan for president, William Reinhardt, and C. S. Jones for vice presidents, and H. L. Westbrook for treasurer. The election of officers is Dec. 19.

Mr. MacMillan, vice-president and legal counsel of the MacMillan Petroleum Co. has gained a position of prominence in California oil history due to his active work in aiding conservation movements.

Mr. Reinhardt, vice-president and production manager of the Shell Oil Co., Mr. Jones, vice-president of Rio Grande Oil Co.; and Mr. Westbrook, vice-president of Belridge Oil Co. are all prominent oil men.

The following men were selected to be voted upon for directors of the association:

R. A. Broomfield, Barnsdall Oil Co.; Chester W. Brown, Union Oil Co.; R. E. Collom, Continental Oil Co.; J. A. Brown, General Petroleum Corp.; J. A. Crawford, Republic Supply Co.; Earle Derby, Standard Gasoline Co.; W. E. Dunlap, Richfield Oil Co.; J. Paul Getty, George F. Getty, Inc.; E. B. Gilmore, Gilmore Oil Co.; Herbert Paul Grimm, Santa Fe Springs oil umpire; S. A. Guiberson, Jr., Guiberson Oil and Investment Co.; Ed. Higgins, California Oil and Gas Association; L. R. Holmes, The Texas Co.; J. H. Jenkins, Associated Oil Co.; A. T. Jergins, A. T. Jergins Trust; Lester Keim, Oil Well Supply Co.; M. E. Lombardi, Standard Oil Co.; P. M. Longan, Mexican Seaboard Oil Co.; A. B. Macbeth, Southern California Gas Co.; A. MacDonald, Hughes Tool Co.; George Machris, Wilshire Oil Co.; Theodore Martin, attorney, A. C. Mattei, Honolulu Consolidated Oil Co.; William C. McDuffie, Pacific Western Oil Co.; E. J. Miley, Miley Oil Co.; J. R. Pemberton, Petroleum Securities Co.; W. B. Pyron, Western Gulf Oil Co.; F. C. Ripley, Chanslor Canfield Midway Oil Co.; A. L. Weil, attorney.

* * *

Tom Rico, formerly geologist for Richfield Oil Co. is slowly recuperating from an illness that has kept him on his back for nearly a year. He had recovered sufficiently to enable him to visit old friends during the Thanksgiving holidays and look over Richfield's new building.

* * *

Will J. Bird, president of Hancock Oil Co. will spend the holiday season in Honolulu, but expects to be back on the job soon after the first of the year.

* * *

Len Walker, superintendent of Pacific Western Oil Co.'s development work at Goleta, California has returned home from the Seaside Hospital at Long Beach following an operation.

* * *

L. C. Burton, formerly department manager for the Richfield Oil Co. in the San Fernando Valley has been promoted to the position as assistant department manager at Oakland. The vacancy left by Mr. Burton's promotion will be filled by Don Pearson of Richfield's Los Angeles office.

* * *

Many Southern California geologists spent the week end of Nov. 23 at San Francisco and although their visit was ostensibly for the purpose of attending the meeting of the Pacific coast division of the American Association of Petroleum Geologists Nov. 21 and 22, many intended to take in the annual clash between the football teams of Leland Stanford and California at Palo Alto, November 23.

Dr. Arthur J. Tieje, professor of geology in the college of engineering at University of Southern California was scheduled to give a paper on "The Age and Ecology of the Uppermost Signal Hill Fauna" covering the extensive study on this subject made by Dr. Tieje and William Farrand during the past year.

Oscar Howard's Hathaway No. 7 at Santa Fe Springs suspended at 9053 feet although reported to be in rich oil sand

* * *

Ralph D. Reed, geologist for The Texas Co., in California, was elected chairman of the Pacific Coast Section of the American Association of Petroleum Geologists for the coming year, at the meeting in San Francisco Nov. 21-22.

* * *

Sunset Pacific Oil Co., the alive and growing remains of the former Julian Petroleum Corp. has increased $2,369,351.32 since federal court receivership appraisal in May, 1927, according to an announcement made by H. L. Carnahan, president of the new company.

Although the total assets of the company are $15,002,241.10 the current assets are only $2,539,348. This latter figure however is more than twice the amount required to be maintained under the trust indenture securing the outstanding bonds.

Among the improvements the company will have to acquire, if it is to continue as an independent company, will be additional modern refining equipment, greater distribution, a loading barge, to serve the harbor terminal and other investments of capital that will prevent dividends for some time to come.

* * *

J. E. Grey, formerly managing director of the Atlantic Union Oil Co., Ltd., distributing subsidiary in New Zealand and Australia, owned jointly by Union Oil Co. of California and Atlantic Refining Co., has been made manager of refined oil exports of the Union Oil Co.

Mr. Grey is well known in the export side of the oil business having organized and operated oil distributing companies in South and Central America.

* * *

F. M. Rowles, formerly manager of domestic sales for the Associated Oil Co. has resigned to take up interests outside of the oil industry and his place has been taken by P. E. Allan formerly assistant manager of domestic sales. Mr. Allan has a service record of 15 years under Associated's colors having held various positions during his rise to his present position.

Completions in Oklahoma and Kansas, Week Ended December 7, 1929

OKLAHOMA

Caddo County

Company	Well No.	Location	Depth	Init. Prod.
English Drlg.	4	NE NW SE 31-6-9 W	3278-3287	125
English Drlg.	1	NWc SW 26-6-10 W	T.D. 3465	Dry

Carter County

Ven-Mex.	1	NE NW SW 30-1-3 W	2339-2644	48M

Cotton County

Shasta	9	C NW NE 2-2-10 W	2126-2154	100

Creek County

Operators	2	SW SE SE 17-19-9 E	2342-2372	5
Operators	3	NW SE SE 17-19-9 E	2260-2304	40
Ice	10	SWc 13-17-10 E	1907-1928	50
Franchot	32	CEL W½ W½ SW 17-17-12 E	1474-1511	15
Tidal	3	CWL E½ NW 22-17-7 E	T.D. 2923	Dry
Henry-Avers	1	SE SW SE 12-17-10 E	T.D. 2499	Dry
Pioneer et al.	1	SW SE NE 18-17-10 E	T.D. 2275	Dry
Atlantic	1	NEc SE 15-14-10 E	T.D. 3420	Dry

Harmon County

Stauffer	1	NWc SE 8-4-26 W	T.D. 625	Dry

Hughes County

McGee Bros.	1	SW SE NW 30-8-12 E	T.D. 3774	Dry
Magnolia	7	SE NW SW 17-5-8 E	2560-2609	250

Kay County

Wentz	3	SWc NE 17-28-1 E	3255-3269	950

Kiowa County

Flanary	1	SWc 25-6-18 W	T.D. 1003	Dry

Lincoln County

Continental	2	NEc NW 36-17-3 E	3900-3937	10M

Muskogee County

Bryan	2	CSL NE SE 4-15-15 E	1600-1606	6
Metzger et al.	11	SW NW SW 1-14-18 E	922-944	30
Burke	1	CNL SW NW 24-13-18 E	620-645	¾M
Ray et al.	1	SEc NE SW SE 15-13-18 E	598-684	2M
Mills et al.	1	NE SE SE 15-13-18 E	T.D. 730	Dry

Okfuskee County

Independent	1	NWc 33-12-10 E	T.D. 3847	Dry
Atlantic	1	NE SW NW 13-10-11 E	T.D. 2116	Dry

Okmulgee County

Devonian	1	SEc NW 6-15-13 E	2590-2604	OWD 20
Levine et al.	1	NWc SE NW 24-14-12 E	1608-1615	1M
Selby	17	SEc NW NE 26-14-14 E	530-544	½M
Penrod-Thompson et al.	11	CSL N½ SE NW 22-13-14 E	2475-2487	15
Denton-Marshall	1	NEc NW 16-15-14 E	T.D. 2410	Dry OWD
Rebold	1	NWc SE 6-15-13 E	T.D. 2615	Dry OWD
Burns	4	C SE SE 1-14-12 E	T.D. 2774	Dry
Simms	6	CSL SE SW 16-13-14 E	T.D. 2030	Dry

Osage County

Minnehoma	5	NEc NW NW SW 11-26-8 E	T.D. 2577	Dry
I. T. I. O.	419	SW NW SE 8-25-11 E	1936-1945	3M
Union	2	SW SE NW 32-23-10 E	2546-2559	200
Mundy et al.	2	NE NE SE 10-21-8 E	2385-2402	30
Oklahoma Natural	1744	NE SW SW 5-21-12 E	873-882	.13M

Pawnee County

Markham	7	SE SE SE 14-21-7 E	1343-1400	7
Nadine	5	NE NW NE 7-20-8 E	2475-2497	200
Swift et al.	6	SWc NE 35-20-9 E	1972-1995	125
McMan et al.	2	NEc SE 27-20-9 E	2140-2164	65
Purser et al.	1	SE NE SE 20-20-10 E	T.D. 2249	Dry

Payne County

Transcontinental	2	SWc SE 4-18-5 E	3616-3629	180
Shaffer	3	NE NW NE 4-18-5 E	3300-3319	1970

Pontotoc County

Baker-Lynch	1	NEc SE 29-5-8 E	810-852	10
Tidal	14	SWc NW 28-5-8 E	829-842	40
Transcontinental	4	SW NW NW 19-5-5 E	2533-2544	120
Transcontinental	5	NWc 19-5-5 E	2401-2428	120
Denver	1	NW SW NW 31-5-5 E	2483-2630	95
Homaokla	4	NE SW SE 33-5-8 E	1091-1100	7M
Indep.-Shaffer	1	NE SE SW 10-5-4 E	T.D. 3341	Dry

Pottawatomie County

Indep.-Darby	1	NW SE NW 22-7-4 E	T.D. 4474	OWD Dry
Magnolia-Pierce	3	NW NE NW 17-7-4 E	T.D. 4133	Dry
I. T. I. O.	3	SE SW SE 35-8-4 E	4174-4298	65
Sinclair	2	NE SE SE 24-7-4 E	4170-4247	165
Houston	6	SW NE SW 17-7-4 E	4125-4144	210
Houston	5	SE NE SW 17-7-4 E	4072-4092	600
Amerada & I. T. I. O.	1	NW NE NE 15-7-3 E	4375-4399	265

Seminole County

Magnolia	10	SE NE SW 18-9-6 E	4317-4333	2205
Sinclair	1	NE NW NE 19-9-6 E	4197-4224	2980
Sinclair	6	SE NE NW 19-9-6 E	4185-4210	5685
Carter	2	NW SW SE 23-7-6 E	3109-3166	190
Harris	1	SE NE SE 8-6-6 E	2860-2865	160
Carter et al.	1	NEc SW 15-10-6 E	T.D. 4575	Dry
Carter et al.	1	SEc NW 16-9-6 E	T.D. 3685	Dry
Magnolia	1	SE NE NW 16-8-8 E	T.D. 4354	Dry

Stephens County

Franklin	1	NWc SE 9-2-6 W	T.D. 3939	Dry
Ellis Drlg.	9	SWc NW 34-1-8 W	1685-1689	12
Franklin	1	NW SW NW 9-2-6 W	3166-3188	550

Wagoner County

Mack Drlg.	1	C SW SE 25-16-16 E	T.D. 1256	Dry

KANSAS

Butler County

Empire	89	NE SW NE 19-26-5 E	2557-2627	30
Empire	4	NE SE NW 34-27-5 E	2718-2747	100
Sinclair	1	NEc 16-26-3 E	T.D. 3318	Dry
Alladin	1	SEc 14-27-3 E	T.D. 3045	Dry
Mohawk	2	SE NE NW 8-27-6 E	T.D. 3148	Dry

Chautauqua County

Griffin-Bell	6	CWL SE 1-32-10 E	1635-1663	30

Coffey County

Selby	1	NEc SW 13-23-14 E	1624-1634	35

Douglas County

Pauline	1	SEc NE 27-13-18 E	T.D. 1250	Dry

Ellis County

Phillips	2	SWc NE 5-12-17 W	3630-3638	390

Greenwood County

Empire	7	NE SE SE 21-23-11 E	1873-1947	195
Sheedy et al.	3	CEL W½ NW NW 5-24-13 E	1617-1630	40
Sheedy et al.	4	SW NE NW 5-24-13 E	1627-1636	300
Empire	4	C SE NW 9-25-13 E	1533-1547	25
Empire	6	CWL SE NW 9-25-13 E	1460-1468	15
Derby	1	NE NW NW 21-22-13 E	T.D. 1940	Dry
Marland	1	CWL SW SE 24-24-9 E	T.D. 2290	Dry
Tulsa	1	NE SE SW 6-24-12 E	T.D. 1814	Dry

Lyon County

Sheedy et al.	1	SE SW SW 18-21-10 E	T.D. 2390	Dry
Gordon-Staats et al.	1	SEc 1-21-11 E	T.D. 2103	Dry
Sheedy et al.	4	SW NW SW 19-21-10 E	2197-2244	150

McPherson County

Empire	1	NE SE NE 9-21-3 W	3306-3309	1000

Morris County

Loomis et al.	1	C SE SW 15-16-7 E	T.D. 250	Dry

Sedgwick County

Wentz et al.	1	NEc NW 24-26-2 E	T.D. 3367	Dry
White Eagle et al.	3	SW NE SE 20-28-1 E	T.D. 3135	Dry
Shell	5	NWc SW SE 15-26-2 E	2905-2909	60
Shell	2	NEc 15-26-2 E	2870-2872	630
Dickey	1	NE SE SE 20-28-1 E	3091-3115	40

Woodson County

Elbar	1	NEc NW 31-23-14 E	T.D. 1751	Dry

Completions in California, Week Ended November 30, 1929

Belridge

Company	Well No.	Location	Depth	Init. Prod.
Ohio Oil Co.	No. 33	....	700	20

Maricopa Flats

California Western Oil Co.	Havenstrite 4	....	3230	3000
Signal Oil and Gas Co.	Sheenan 5	....	3485	435

Round Mountain

Shell Oil Co.	Fauman 5	....	1590	250

Santa Fe Springs

Commodore Oil Co.	Landell 4	....	7972	1860
General Pet. Corp.	S. F. 145 D	....	6224	2400
General Pet. Corp.	S. F. Community 189C	....	7920	1000
General Pet. Corp.	Jalk 114	....	8095	1060
Getty, Geo. F. Inc.	S. F. 17	....	8000	4610
Getty, Geo. F. Inc.	S. F. 38	....	8138	700
Richfield Oil Co.	Howard 5	....	8103	4000
Shell Oil Co.	Thompson 6	....	8097	500
Standard Oil Co.	Walker 12	....	6826	killed to deepen
The Texas Co.	Matern 3-13	....	7930	180
The Texas Co.	Matern 3-15	....	7740	1400
Universal Oil Co.	Blanchard 10	....	7850	3500

Temblor

Union Oil Co.	Williams 1	....	2888	250

New Field Operations in Oklahoma, Kansas, North, North Central, East Central, Panhandle and West Texas, Week Ended December 7, 1929

OKLAHOMA

Caddo County

Company	Well No & Farm	Location	
Magnolia	3-Rowe	SE NE NE 36-6-10 W	
Bullock et al.	2-Royce	SWc SE SW NE 12-5-9 W	

Creek County

Bailey et al.	4-Walker	NWc SW SW 21-18-9 E	OWD
Harwell et al.	1-Colvin	NEc SW SW SE 31-18-11 E	
Magnolia-Prairie	10-Eagle	CWL NW NW 27-17-7 E	OWD
Nickleson	1-Clover	CNL NW NE 6-17-11 E	

Hughes County

Magnolia	1-Brown	SEc NE 12-9-8 E	
Dixie	4-Cornelius	NE SW SW 17-8-10 E	
Troutt et al.	2-Bird	SW NE NW 5-8-11 E	

Kiowa County

Alexander et al.	1-Prough	SWc NW SW SW 17-6-16 W	

McIntosh County

Company	Well No. & Farm	Location
Western Natural	2-Coon	NWc SE NW 21-11-17 E

Muskogee County

Aggas	2-Wheat	NE SE SW 28-16-15 E
George	2-Caeser	SWc 33-14-16 E
Ray et al.	1-Weaver	SEc SW SE 15-13-18 E
Graves et al.	1-Davis	SEc NE 14-13-16 E

Noble County

Midco	16-Case	C SW NE 29-24-1 W

Okfuskee County

Sunray et al.	3-Wilson	NWc SW 22-12-11 E
Champlin	15-Jacobs	NWc SE SE 15-11-11 E
Champlin	8-Washington	NWc NE SE 15-11-11 E

(*Continued on Page 63*)

New Field Operations in Oklahoma, Kansas, North, North Central, East Central, Panhandle and West Texas, Week Ended December 7, 1929

(Continued from Page 62)

Company	Well No & Farm	Location	
Havel et al	1-Grayson	SWc SE 23-11-11 E	OWD
Moffett et al	1-Wilson	NEc SW NE 26-11-11 E	
Riverside-Billingslea	1-Blackman	NWc SW SW 33-11-11 E	
Oklahoma County			
I. T. I. O. et al	2-Speegle	NW SW SW 24-11-3 W	
Sinclair	1-Bence	NWc SE 31-11-2 W	
Sinclair-Amerada	4-Kinter	SE SW SE 30-11-2 W	
Sinclair-Amerada	3-Kinter	NW SW SE 30-11-2 W	
Okmulgee County			
Sheridan	4-Peters	CNL N½ SE SE 33-16-11 E	
Rebold	3-Brooks	CSL SW NE 6-15-13 E	
Osage County			
Winona	9	CSL N½ NE 20-29-9 E	
Peters-Prod. & Ref.	2	NE SE NE 10-26-8 E	
Stanley et al	2	SWc 10-25-8 E	
I. T. I. O.	1	NW NE SW 32-23-10 E	
Stanley et al	3	NWc NE 14-21-8 E	
Okla. Natural	1748	SEc NW 35-21-11 E	
Okla. Power & Water	128	NW SW SW 4-20-10 E	
Okla. Power & Water	127	NE NW NW 9-20-10 E	
Pawnee County			
Sample et al	1-Sample	SW NW NW 36-20-8 E	
Pontotoc County			
Rush-Vaughn	2-Roper	NW SE NW 32-5-5 E	
Dixie	3-Herman	NW SW SW 6-4-8 E	
Pottawatomie County			
Pine	3-Smith	NE SW NE 8-8-5 E	
I. T. I. O.	2-Brandenburg	SWc 35-8-4 E	
Magnolia	1-Jordan	NE SW SE 12-7-4 E	
Prairie	1-Walters	NW SE SE 12-7-4 E	
Sinclair	1-Wilamett	SW NE SE 12-7-4 E	
Magnolia	1-Cherry	SEc SW 13-7-4 E	OWD
Magnolia	2-Richardson	SWc 15-7-4 E	OWD
Seminole County			
Amerada-Dixie	3-Fullerton	SW NE SE 19-9-6 E	
Tidal-Interocean	3-Lasley	NW NE SW 19-9-6 E	
Gypsy	3-Taylor	SW NE SW 19-9-6 E	
Magnolia	1-Miller	NW NE SW 16-8-7 E	
Magnolia	1-Reed	NE SE NW 31-6-8 E	
Champlin-Empire	2-Skinner	NWc SW 9-6-6 E	
Gypsy	1-Harjoche	NEc SE 8-6-6 E	
Magnolia	3-Parney	NW NE SE 14-5-7 E	
Blackwell	1-Lusty	SWc SE 12-5-7 E	
Stephens County			
Pace-Texhoma	5-Houston	SEc NW SW 2-2-8 W	
Pace-Texhoma	6-Houston	NEc SW SW 2-2-8 W	
Ven-Mex et al	1-Howard	SEc NW 5-2-6 W	
Ven-Mex et al	1-Andrea	SW NE SE 5-2-6 W	
Magnolia	2-Andrea	NE SE NE 8-2-6 W	
Franklin	2-Brooks	SEc NE 8-2-6 W	
Franklin	2-Spain	SWc NW 9-2-6 W	
Franklin	2-Green	NW SE NW 9-2-6 W	

KANSAS

Company	Well No & Farm	Location
Chase County		
Empire	1-Newman	SEc NE 24-20-9 E
Steinbuchel et al	1-Stevenson	NEc SW 4-20-6 E
Coffey County		
Cross et al	1-Fressenden	SWc NE 33-22-14 E
Cowley County		
Edenfield-Fair	1-Boostien	C W½ NE 17-34-4 E
Greenwood County		
Simmons-Amerada	1-Ellis	NW NE NW 27-23-11 E
Dixie-Amerada	4-Ellis	SE NW NW 27-23-11 E
Mendenhall et al	2-Grossart	CSL NW NW 9-25-13 E
Marion County		
Empire	1-Black	NE NW SW 27-19-2 E
Russell County		
Gilbreath-Krueger et al.	1-Bratton	C NE 33-11-13 W
Sumner County		
Blankenship	1-Rifle	NWc SW 2-34-4 W

TEXAS
NORTH CENTRAL & EAST CENTRAL

Company	Well No & Farm	Location	
Anderson County			**Survey**
Roeser-Pendleton	1-Moody Est.	.....	Welch
Brown County			
Smith	15-George	.....	Chaddick
Tyler et al	1-Gaines	Sec-43	HT&B
Gordon	5-Cannon	Blk-3	Arenbeck
Buder	8-Munselle	Blk-3	Arenbeck
Paramount	1-Guyer	Sec-22	HT&B
Lloyd	31-Collier	.....	Smith
Owens Inc	1-Whiteside	Blk-627	Banister
Callahan County			
Holden et al	2-Cavanaugh	Blk-98	Comal Co. Sch. Ld.
Mook Texas	1-Johnson	Blk-83	Comal Co. Sch. Ld.
Union Oil Co. of Nevada	1-Jackson	Sec-20	ET
Coleman County			
Permain et al	6-Crowder	Blk-483	Woods
Eastland et al	2-Crowder	Blk-483	Woods
Brown et al	2-Turner	Blk-234	Wilson
Gutzman-Aldrich et al.	1-Smith	Sec-87	GH&H
Eastland County			
Lone Star	4-Storm	Sec-482	SP
Wood County			
Gulf Prod	1-Stewart et al.	.....	Tollett

NORTH TEXAS

Company	Well No & Farm	Location	
Archer County			
Panhandle	1-Cockrell	Sec-2450	TE&L
Shappell	14-Lyles	Blk-7	Hooper
Bridwell	1-Taylor	Sec-14 Blk-3	ATNCL
Seabery	1-Brown	Sec-98 Blk-13	ATNCL
United Prod	1-Parkey	Sec-2	ATNCL
Burns	4-Wilson	Sec-115	ATNCL
Burns	1-Turbeville	Blk-153	Carson
Key-Leath	2-Logan	Blk-23	Taylor
Shell	1-Duprist	Sec-2490	TE&L
Sun	10-Richardson	Sec-2425	TE&L
Christie	1-Kunkel	.....	Stell
Madden-Junker	1-Kunkel	.....	Stell
Perkins-Cullum-Parson	1-Williams	.....	Swing
Baylor County			
Barnsdall	A1-Portwood	Sec-1280	TE&L
Consolidated	3-Portwood	Sec-1281	TE&L
Clay County			
Merrick-Belcher	7-Bates	Blk-6	Parker Co. Sch. Ld.
Merrick-Belcher	6-Bates et al.	Blk-6	Parker Co. Sch. Ld.
Cooke County			
Kewanee	1-Pickett	.....	Sadler
Montague County			
Texas	A4-Cunningham	.....	Norton
Wichita County			
Bateman-Dingee	1-Taylor	.....	Cole
Stumpf	2-Waggoner	Sec-8 Blk-8	GH&H
Humble	18-Taylor	Blk-81	KWVFL
Staley-Wynne	1-Hodge	Blk-32	KWVFL
Hobbs	1-Hodge	Blk-32	KWVFL
Stumpf	1-Chilson et al.	Blk-3	Ramsey
Star Drlg	4-Stumpf	League-4 Blk-10	DCSL
Wilbarger County			
Atlantic-Seigler	6-Waggoner	Sec-35 Blk-2	H&TC
Staley-Wynne	S4-Waggoner	Sec-25 Blk-4	H&TC
Texas	D5-Waggoner	Sec-43	MEP&P
Waggoner	P5-Waggoner	Sec-35 Blk-2	H&TC
Waggoner	P6-Waggoner	Sec-35 Blk-2	H&TC
Waggoner	P7-Waggoner	Sec-35 Blk-2	H&TC
Shaw	E8-Waggoner	Sec-18 Blk-4	H&TC
Lido	C1-Waggoner	Sec-35 Blk-2	H&TC
Lido	C2-Waggoner	Sec-35 Blk-2	H&TC
Davis	5-Waggoner	Sec-35 Blk-2	H&TC
Grayback Dev	1-Waggoner	Sec-50 Blk-2	H&TC
Bass-Dillard-Simms	B1-Waggoner	Sec-30	Poitevant
Beard	1-Waggoner	Sec-10 Blk-17	H&TC
Fain-McGaha	AA5-Waggoner	Sec-18 Blk-4	H&TC
Young County			
Goldsmith-King	7-Kunkel	.....	Stell
Western Prod	1-Anderson	Sec-1591	TE&L
Lowery	3-Atchley	Sec-226	TE&L
Wooten-Reed	2-Casey	.....	Casey
Perkins-Cullum	2-Dietrich	.....	Stell

PANHANDLE

Company	Well No & Farm	Location	
Gray County			
Magnolia	3-Wright	Sec-13 Blk-3	I&GN
Texas	8-Faulkner	Sec-29 Blk-B-2	H&GN
White Eagle	3-Faulkner	Sec-29 Blk-B-2	H&GN
Hutchinson County			
Spurlock et al	1-Christian	Sec-33 Blk-Y	A&B
Wheeler County			
Martin-Debons	2-Close	Sec-83 Blk-23	H&GN

WEST TEXAS

Company	Well No & Farm	Location	
Crane County			
Republic Prod	1-Hughes	Sec-2	Prather
Tidal	3-Univ.	Sec-39 Blk-30	Univ.
Warner-Quinlan	6-Univ.	Sec-39 Blk-30	Univ.
Crockett County			
Cushing	3-Powell	Sec-53 Blk-BB	TC
California	1-Shannon	Sec-42 Blk-BB	EL
Howard County			
Midwest Explor	C5-Clay	Sec-138 Blk-29	W&NW
Continental	3-Clay	Sec-138 Blk-29	W&NW
Amerada	14-Roberts	Sec-137 Blk-29	W&NW
Continental	A10-Settles	Sec-158-Blk-29	W&NW
Mitchell County			
Magnolia	1-Snyder	Sec-36 Blk-30	T&P
Pecos County			
Texas	2-McDonald	Sec-46 Blk-12	H&GN
California	9-Smith Lse-1	Sec-23 Blk-194	TC
Taylor-Link	11-Univ.	Sec-14 Blk-18	Univ.
Landreth Prod	2-Univ.	Sec-31 Blk-16	Univ.
Kirby	1-Stockton Cattle Co.	Sec-2 Blk-228	TC
Terrell County			
Transcontinental	1-Good	Sec-26 Blk-161	GC&SF
Ward County			
Gulf Prod	3-Hutchings Stock Association	Sec-1 Blk-F	G&MMB&A

Completions in Texas, Week Ended December 7, 1929

NORTH CENTRAL & EAST CENTRAL

Brown County

Company	Well Farm	Survey	Sec. & Blk.	Depth	Init. Prod.
Bearman et al	7-Spencer	Swindle		1078-1089	20
Crab-McNeil	6-Ekberry	Williams	Blk-146	1414-1415	25
Gilman-McMurray	21-Teston	Smith	Blk-155	1229-1245	8
Humble	4-Munselle	Arenbeck	Blk-3	1140-1152	20
Continental	1-Lowe	Little	Blk-39	T.D. 750	Dry
Danciger et al	1-Prater	Viser	Blk-21	T.D. 1600	Dry
Smith	2-Kesler	Kesler	Sec-42	T.D. 1326	Dry
Stout-Crab-McNeil	1-Gaines	Jordan		T.D. 2460	Dry
Young Bros.-Alexander-Woodley	13-Kilgore	McClure	Blk-152	T.D. 1350	Dry

Callahan County

Testerman	5-Alvey	TE&L	Sec-2272	414-425	2
Schafner	5-Cowan	Comal Co. Sch. Ld.	Sec-74	255-275	1½
Warren et al	3-Biggerstaff	SP	Sec-310	T.D. 670	Dry

Coleman County

Joines et al	2-Stewardson	ET	Sec-96	T.D. 1556	Dry
McDonald-Campbell-Gwinnup	1-Rohn	GH&H	Sec-76	T.D. 2213	Dry
Continental et al.	6-Overall	Barkley	Blk-701	2182-2196	6
Gutzman-Aldrich et al.	1-Hass	GH&H	Sec-71	1477-1483	7.6M
Tower-McKanna	8-Crowder	Woods	Blk-483	2020-2021	150

Comanche County

Sun et al	1-Bryson	Sypert		T.D. 3135	Dry

Eastland County

Gholson	3-Fox	McLennon Co. Sch. Ld.	Blk-28	T.D. 1122	Dry
Lone Star	2-Storm	SP	Sec-470	3536-3542	3,089M
Bearman	1-Kincaid	H&TC	Sec-80 Blk-4	3476-3498	150

Jack County

Republic Prod	1-Ezell	Hughson		3153-3172	300

Shackleford County

Tannehill	27-Hewett	T&P	Sec-11 Blk-11	973-977	15
Big States	14-Webb	T&P	Sec-17 Blk-11	T.D. 1050	Dry
Ducker et al	1-Mathews	ET	Sec-56	T.D. 1202	Dry
Merry Bros.-Perrin	1-Davis	T&P	Sec-14 Blk-12	T.D. 1580	Dry
Robinson	1-Black	TE&L	Sec-508	T.D. 794	Dry

Stephens County

Lone Star	2-Calloway	SP	Sec-2 Blk-C	2112-2150	2¼M
States Oil	5-Sykes	T&P	Sec-84 Blk-6	1900-1920	26
Grace et al	1-Allison	TE&L	Sec-2243	T.D. 2029	Dry

NORTH TEXAS

Archer County

Barnsdall	17-Wilson	Howard		1713-1715	96
Petroleum Prod.	1-Lanster	BBB&C	Sec-3	1118-1128	24
Sheppell	12-Lyles	Hooper et al.	Blk-7	1700-1701	30
United Prod	2-Kunkel	Stell		1152-1153	61
Burns	1-Kemp	Fanning		T.D. 1850	Dry
Burns	1-Parrish	ATNCL	Sec-106 Blk-2	T.D. 1532	Dry
Burns	3-Wilson	ATNCL	Sec-115	T.D. 1478	Dry
Heydrick Camp Drlg.	1-Harris	Meade	Blk-4	T.D. 1457	Dry
Hill-Consolidated	1-Neale	White		T.D. 1101	Dry
United Prod	4-Kunkel	Stell		T.D. 1158	Dry
Burns	6-Tidal	Carson	Blk-152	T.D. 1484	Dry

Clay County

Art et al	3-Byers Bros.	Byers Bros.	Sec-16	T.D. 1017	Dry
Mayfield et al	1-Mason	Madison Co. Sch. Ld.	Blk-30	T.D. 1414	Dry
Heydrick-Reeder et al.	1-Byers Bros.	Byers Bros.	Sec-16	1015-1020	36

Cooke County

Company	Well Farm	Survey	Sec. & Blk.	Depth	Init. Prod.
Simmons	3-Wheelock	Teal		1317-1326	15
Coline	5-Huggins	SP		1017-1116	129

Denton County

McMeans et al	1-Miller	Lynde		T.D. 1630	Dry

Foard County

Humble	1-Matus	H&TC	Sec-33 Blk-8	855-900	1½M

Montague County

Pace et al	1-Cobb	Grimes		T.D. 1900	Dry

Wichita County

Cooper-Bradley	1-Foster et al.	HT&B		T.D. 1942	Dry
Everetts-Jamison	2-Gibson	Waggoner	Blk-302	1908-1913	30

Wilbarger County

Shaw	E6-Waggoner	H&TC	Sec-18 Blk-4	2412-2424	58
Staley-Wynne	G16-Waggoner	H&TC	Sec-32 Blk-4	1838-1861	60
Staley-Wynne	S3-Waggoner	H&TC	Sec-25 Blk-4	1888-1889	150
Waggoner	J13-Waggoner	H&TC	Sec-25 Blk-4	2392-2402	50
Bradstreet	C3-Waggoner	H&TC	Sec-31 Blk-4	2292-2299	140
Easter	D1-Waggoner	H&TC	Sec-26 Blk-4	2424-2438	36
Empire	C11-Waggoner	H&TC	Sec-25 Blk-4	2421-2430	15
Fain-McGaha	L14-Waggoner	H&TC	Sec-31 Blk-4	2298-2300	140
Golding-Cochran	J3-Waggoner	H&TC	Sec-17 Blk-4	2408-2422	75
Grayback Dev	3-Waggoner	H&TC	Sec-49 Blk-2	2667-2693	130
Worth Vernon	1-Lutz	H&TC	Sec-39 Blk-12	T.D. 2685	Dry

Young County

Christie	1-Waddell	TE&L	Sec-83	T.D. 1264	Dry
Johnson et al	1-Edwards	TE&L	Sec-71	T.D. 1282	Dry
Long	7-McCaghren	TE&L	Sec-1367	T.D. 955	Dry
Perkins-Cullum	5-Lemmons	BBB&C		T.D. 744	Dry
Atlantic	1-Jarnagin	Orrick		T.D. 3895	Dry
Fluty et al	1-Wadley Bros.	Coffman		T.D. 4565	Dry
Wise-Jackson	5-Cullers	Hyatt		554-595	30
Baker-Pardue et al.	1-Donnell	Bellah		3298-3312	250
Cunningham et al.	1-Kisinger	Conner	Sec-2	2497-2540	200

PANHANDLE

Gray County

Skelly	5-Jackson	H&GN	Sec-90 Blk-B-2	3020-3055	500
Humble	3-Jackson	H&GN	Sec-90 Blk-B-2	2965-3050	985

Hutchinson County

Penney et al	2-Johnson	A&B	Sec-35 Blk-Y	3045-3060	50

Wheeler County

Upham	6-Gootch	H&GN	Sec-81 Blk-23	1488-1592	401½M
Staley-Wynne	1-Hicks	H&GN	Sec-53 Blk-17	1925-1940	8M
Lone Star	1-Martin	H&GN	Sec-52 Blk-17	1875-2002	19M

WEST TEXAS

Borden County

Louisiana	1-Miller	H&TC	Sec-355 Blk-97	T.D. 4011	Dry

Crockett County

Moncrief et al	3-Todd	GC&SF	Sec-29 Blk-WY	T.D. 1649	Dry

Glasscock County

Shell	1-Kloh	T&P	Sec-11 Blk-33	T.D. 2574	Dry

Howard County

Plymouth	7-Morgan et al.	T&P	Sec-5 Blk-32	2200-2257	800
Plymouth	6-Morgan et al.	T&P	Sec-5 Blk-32	2175-2323	250
Continental	2-Kloh et al.	T&P	Sec-13 Blk-33	2267-2308	914

Pecos County

Taylor-Link	7-Univ.	Univ.	Sec-31 Blk-16	947-957	71 (1 Hr.)
Landreth Prod	3-Univ.	Univ.	Sec-13 Blk-18	1657-1679	562
Independent-Rowan et al.	2-McDonald	H&GN	Sec-46 Blk-12	T.D. 1662	Dry

Upton County

Texas Pacific	15-Lane	GC&SF	Sec-5	2016-2063	116
Texas Pacific	1-Sheik	MK&T	Sec-1 Blk-3	2420-2498	600

Completions in North Louisiana and Arkansas, Week Ended December 6, 1929

Louisiana—Bossier Parish

Company	Well	Location	Depth	Yield
Louisiana Gas & Fuel Co.	Lawrence No. 1	12-17-12	1745	500,000 ft. gas
Louisiana Gas & Fuel Co.	Murff et al. No. 1	24-17-12	879	22M ft. gas

Caddo Parish

Arrow Oil Synd.	Pender No. 1	11-20-15	2395	salt water, aband
Double H Oil Co.	Spell No. 12	15-21-15	1690	35 bbls.
Simplex Oil Co.	Hunsicker No. 7	15-20-15	2219	50 bbls.
J. C. Tippett	Caddo Levee Bd. No. 1	26-21-16	1860	salt water, aband.
Haynes Bros.	Oden No. 2	20-19-14	2395	dry, abandoned
S. T. Onyett, Trustee	Dickson No. 1	10-19-14	2444	30 bbls.
Texas Company	Hunter No. 3	8-19-14	2448	salt water, abnd
Texas Company	Sentell No. 1	9-19-14	2442	10 bbls.

LaSalle Parish

Air Lift Oil Co.	Urania A-8	7-10-2E	1531	50 bbls.

Morehouse Parish

J. S. Harkness	Bowles No. 11	18-20-5E	2187	3¼M ft. gas
Southern Carbon Co.	Tensas Delta No. 12	2-20-4E	2177	4¼M ft. gas

Ouachita Parish

Pipes & Mack	Burk Est. No. 1	6-18-15E	2228	1¼M ft. gas
New Process Carbon Co.	Cole No. 2	35-20-4E	2165	3½M ft. gas

Richland Parish

Company	Well	Location	Depth	Yield
International Gas Prod. Co.	Boughton No. 1	36-16-6E	2471	19M ft. gas
Northern La. Nat. Gas Co.	Boykin No. 4	20-17-6E	2398	51 M ft. gas
Northern La. Nat. Gas Co.	Colvin A-1	34-17-6E	2450	1½M ft. gas

Sabine Parish

R. L. Gay, Trustee	Sabine Lbr. Co. No. 2	23-7-14	3830	dry, abandoned

Union Parish

Bahan & Bahan	Parks No. 2	2-20-3E	2175	4M ft. gas
E. S. Hall	Spencer No. 3	2-20-3E	2126	4M ft. gas

East Texas—Harrison County

Nick Barbare	C. M. Abney No. 3	Co-Ord M-19	2346	dry, abandoned

Arkansas—Ouachita County

Wesson et al.	Booth No. 1	12-15-19	2227	dry, abandoned
J. E. Crosbie, Inc.	H. Primm No. 4	23-15-16	2040	40 barrels
Charles McDonald	Fogle No. 1	18-14-16	2301	dry, abandoned
Magna Prod. Co.	McKenzie B-1	36-15-16	2438	dry, abandoned
Oil Fields Corp.	McKenzie No. 10	36-15-16	2002	15 barrels
Sundby et al.	Watts No. 1	27-15-15	2052	10 barrels

Union County

E. M. Jones	Henry Murphy No. 1	2-16-15	1981	15 barrels
Imperial O. & G. Co.	Murphy No. 4	9-16-15	2386	60 barrels

Repressuring Authorities Cover Wide Range in Institute Paper

CHICAGO, Dec. 7

AT WHAT stage in the life of a field is repressuring best started? What can be done to unify leases of different ownership and make repressuring more efficient? These and many other questions on the pertinent topic of repressuring were answered or opinions expressed by many authorities and presented in the meeting on production practice, Dec. 4, at the American Petroleum Institute convention.

The paper was of the question and answer type. Questionnaires were sent to production engineers of a number of companies some weeks ago. The questionnaire was prepared by the American Petroleum Institute, division of development and production engineering in cooperation with the U. S.. Bureau of Mines. H. C. Miller, of the Bureau, compiled the 24 answers that were received and this compilation constituted the paper on the subject of repressuring.

The paper, condensed version, is as follows:

Should Maintenance of Pressure Be Started As Soon As Possible In The Life Of a Field?

The consensus of opinion, as expressed in the majority of replies to this question, is that maintenance of pressure should be started as soon as possible in the life of a field. Certain engineers, however, contend that early maintenance of pressure must be carried out under a plan of unit operation in order to secure maximum results—unless the company that is carrying on the pressure maintenance project owns, or controls, the entire oil bearing structure. One engineer, who has had considerable experience in deep sands in California, is of the opinion that when the properties on a structure are not operated as a unit, injection of gas should be delayed until the wells are about to cease flowing naturally.

One Mid-Continent engineer believes that there is a critical point in the life of every field at which repressuring should be started, and that the statement that repressuring should be started as soon as possible in the life of a field cannot be made to apply to all fields. The so-called critical point will vary for different fields, and can be determined only from a study of development and operating conditions in the fields. Three other Mid-Continent engineers answered that maintenance of pressure should be started as soon as *practicable*—they being of the opinion that the high pressures in certain newly developed fields would make early injection of gas into those fields uneconomical.

A California engineer suggests waiting until the wells approach the end of their natural flowing lives before injecting gas, thus avoiding high pressure operations.

What Results Will Be Accomplished If Maintenance Is Started During Early Life of Field?

Maintaining the pressure in oil bearing formations, and operating the wells in accordance with scientific pressure control methods, result in extending the natural flowing life of wells; retard the rate of oil production decline; lengthen the period in which gas-lift operations can be carried on, and increase the pumping production above that obtained if repressuring had been delayed or not carried on at all. Furthermore, pressure maintenance maintains the gravity of the oil and retards the encroachment of edge water. Lengthening the flowing life of a field allows the production of a greater percentage of the total recoverable oil at a lower unit cost than is possible otherwise; and usually, according to one answer to the question, ultimate production will be increased in about the same proportion in which the natural flowing period has been extended.

Returning excess natural gas to the producing formation during the early life of a field conserves gas which is usually most plentiful and most flagrantly wasted during the initial stages of a field's development. If the gas which is not sold or used for fuel is returned to the producing formation from which it originated, the ratio of gas produced from the formation per barrel of oil recovered may be assumed to be the volume of gas lost, sold, or used for fuel oil per barrel of oil lifted. For example, if a property produces 1,200,000 cu. ft. of gas and 1000 bbls. of oil a day, and 1,000,000 cu. ft. of this gas is returned to the producing formation each day, the net gas-oil ratio—in effect the formation gas-oil ratio—would be 200,000 divided by 1000 or 200 instead of 1200, as would be the case if no gas were returned. One engineer reported that the increase in gas production from a field because of early repressuring will be in direct proportion to the amount of gas which is returned.

Pressure maintenance postpones the time when the supply of natural gas in an area is exhausted and air, with its attendant corrosive features and explosive hazards, will have to be used or gas from other fields brought in.

Maintenance of pressure during the early life of a field should be encouraged. Increased ultimate production of oil and gas and the conservation of gas for use at a later date—to mention nothing of the other advantages resulting when the pressure in oil bearing formations is maintained at or near the original pressure—bid production engineers and operators to give pressure maintenance detailed consideration.

What Will Be the Effects of Delaying Repressuring and Starting at a Later Date? This with Regard to Water Encroachment, Oil Recovery, and Cost of Conducting Operations?

The total oil and gas produced from a field in which repressuring has been delayed will not be equal to that which would have been produced had the field been under pressure maintenance operations, mainly because of:

a. Irregular water encroachment which may trap large quantities of oil,

b. By-passing of gas through depleted horizons,

c. Increased viscosity of oil due to pressure having been relieved and dissolved gases allowed to escape.

d. The possibility of having to use gas from other fields,

(This opinion was given by an engineer from Texas, who stated that the gas which is produced with an oil is more soluble in that oil than a gas from another field).

e. It is believed impossible to recharge oil with gas energy equivalent to initial reservoir conditions.

A California engineer is of the opinion that delayed repressuring recovers as much oil as early repressuring, provided no appreciable part of the producing sand is flooded by water. Delayed repressuring, however, may result in excessive by-passing of gas, necessitating shutting in some of the producing wells; and, consequently, there will be a reduction in the amount of oil produced. Where delayed repressuring has been tried in certain thick zones in which there were several producing sands, the results were complete failures.

There is a diversity of opinion among engineers as to the comparative cost of conducting operations by maintaining the pressure and repressuring later in the life of fields.

Twelve engineers believe that delayed repressuring results in higher operating costs; seven are of the opinion that the cost will be less; two believe that there is no difference, and three are non-committal.

The reasons advanced for higher costs due to delayed repressuring are:

a. Longer operating life of producing wells,
b. Handling of large amounts of water,
c. Cost of treating oil and water mixtures,
d. Greater volumes of gas must be injected to produce a barrel of additional oil,
e. The possible purchase of gas,
f. Higher overhead expense, due to prolonged operations and the fact that considerable well repair work may be necessary in order to maintain satisfactory gas input wells.

Proponents of lower costs for delayed repressuring give as their reasons:

a. Lower injection pressures, requiring less expensive machinery, lower installation costs and lower operating expenditures,
b. Less expense to equip and maintain pressure wells.

What Pressures Are Required in Excess of Normal Rock Pressures?

No apparent relationship exists between the formation (rock) and injection pressures. The pressures required to inject gas or air into oil bearing formations depend upon the porosity and permeability of the formation, the size of the individual sand grains composing the producing formation, the degree of saturation, the volume of gas injected, the injection medium, the life of the field, the degree of water encroachment, and to some extent upon the distance between the injection and producing wells. Tight or consolidated sands generally require higher injection pressures than loose unconsolidated sands; and where water is present in the producing sands, high pressures may be required to force gas into the formation.

What Objections Are There to High Pressure Operations From the Standpoint of Operation and Costs?

The principal objections to high pressure operations are:

a. Installation, maintenance, and operating costs of high pressure equipment,
b. Explosion hazards.

There seems to be a mistaken belief among many engineers and operators that the cost of compressing gas to pressures high enough to overcome the high formation pressures which exist in many fields during their early life is excessive. Ordinarily, the cost of compressing gas to high pressures is but a fraction above the cost of compressing it to low pressures; in fact, it is the first 100 or 200 lb. in the compression of gas to high pressures which is the really expensive pressure.

The cost of compressing natural gas to high pressures during the early life of a field is relatively inexpensive when the gas and oil from high pressure wells is "double trapped" and only the gas from the high pressure separator is compressed sufficiently to return it to the reservoir sands. By separating the gas from the oil in a series of traps, the bulk of the gas will have to be compressed only from the pressure which is maintained in the high pressure trap to the pressure which is required to force it back into the sands.

One operator of high pressure equipment agrees that there is a slight increase in operating cost over that of low pressure operations, due mainly to greater wear of piston rings; but states that this mechanical trouble which is due to lubricating difficulties is not sufficient to condemn the injection of gas into reservoir sands under high pressure.

What Are Points in Favor of High Pressure Maintenance Operations?

High pressure maintenance operations result in the conservation of natural gas and in the recovery of a larger proportion of the oil from reservoir sands than is obtained by ordinary operation of a property or by delayed repressuring. High pressure maintenance retards the normal rate of oil production decline and by lengthening the natural flowing life of a field lowers the unit cost of lifting oil to the surface.

Gas is often available at high pressures during the early life of fields; and, consequently, compression costs can be reduced materially by "double trapping" the oil and gas in high pressure separators. When gas injection is started during the flush period in a field's life, proper control of pressures and gas migration may be exercised, and the possibilities of the injected gas by-passing oil saturated areas and channeling to nearby producing wells is minimized.

What Has Been the Observed Effect of Increased Production and Retardation of Water Encroachment Where Repressuring Has Been Started in the Early Life of the Field? What Effect Where This Has Been Delayed?

Although several engineers maintained that it was difficult to determine if production had actually been increased because of high pressure maintenance operations, the majority of those who answered this question were of the opinion that the normal rate of production decline was reduced materially when repressuring was started in the early life of fields.

Perhaps the greatest advantage of early repressuring, over delayed repressuring, is that early gas injection is instrumental in holding back edge water along a uniform front. Delayed repressuring, on the other hand, has had little noticeable effect on the encroachment of water on many properties, and irregular water encroachment has resulted in the premature abandonment of many producing wells.

What Method Has Been Used to Determine Best Location of Input Wells for Maintenance of Pressure in New Fields with Regard to a. Structural Conditions; b. Oil, Gas, and Water Conditions; c. Property Lines?

There is no one method by which the best location of input wells for maintenance of pressure in new fields can be determined. Oil, gas, water, and structural conditions and property lines must all be considered when locating input wells in fields where competitive production methods are practiced. Nine engineers locate input wells low on the structure; three locate them on structural highs; and two locate their pressure wells so that the effect of the input gas will be noted in wells both up and down the dip of the structure. One of the engineers, who locates input wells on the flanks of the structure, is of the opinion, although he stated that he had no definite confirmatory information, that where a field is operated as a unit, input wells should be located at the top of the structure.

What Methods of Operation Have Been Worked Out to Include Adjacent Properties in a Repressuring Deal Where Ownership Is Different?

Agreements between adjacent property owners, whereby their input wells offset one another or are staggered along the property lines and equidistant from the lines, the maintenance of equal injection pressures in all input wells, and the injection of equal volumes of gas into each offsetting input well, are the most common methods of joint repressuring operations in fields of diversified ownership. In addition, some agreements have been made which call for the holding of equal back pressures in the producing wells on each property, and others require the maintenance of certain agreed pressures in the formations. In a few fields, input wells have been drilled jointly by adjacent property owners along the boundary line between their properties; and these wells are being supplied with equal volumes of gas from each property or from a central compressor plant.

In some fields where repressuring is carried on jointly through cooperative agreements between adjacent property owners, the gas for repressuring purposes is collected from the different properties and brought to a central compressor plant, where it is compressed and prorated, or sold by meter, to the different operators. Usually the central compressor plant

is run by one operator, and sometimes a flat rate for compression service is charged; less frequently the expenses of operating the compressor plant are prorated among the operators drawing gas from the plant.

What Method Do You Use to Check Distribution or Subsurface Migration of Pressure Over Your Properties When Repressuring?

On some properties, the direction of subsurface migration of pressure is determined by noting the increase and decrease in daily oil and gas production and the casinghead pressures in wells surrounding the input wells. The changes in the amount of oil produced daily are determined usually from the daily gage reports or by intermittent production tests. Gas production is checked by metering the output gas continuously, or at regular intervals by portable gas metering equipment.

One operator reported that he used a bottom hole pressure bomb to obtain data on the distribution of the pressure in the producing formation, and another said that the appearance of floating sand in producing wells has at times indicated the subsurface migration of pressure.

When air is used as the repressuring medium, frequent analyses of the output air-gas mixtures provide additional data on the migration of the injected air in the subsurface formations.

With a Check on Migration of Pressure, Have You Been Able to Control the Same? If So, What Methods Have You Used?

Seventy per cent of the engineers who answered this question have been more or less successful in controlling the migration of pressure in subsurface formations. Where by-passing of gas has not been too well established, the migration of pressure is controlled by back pressuring producing wells, either at the casinghead, or—in the case of pumping wells—by raising the level of the fluid in the hole. The fluid level in pumping wells is raised by decreasing the length of pumping stroke, reducing the number of pumping strokes per unit of time, or by raising the pump barrels. The usual method of controlling the migration of gas where wells are flowing naturally through tubing is to restrict the flow from the tubing by reducing the size of the orifice in the flow lines and, in turn, maintain high pressures on the casings.

Distribution of pressure has been successfully controlled for over two years in the Cooke Pool in Texas by varying the height of the fluid level in the wells and watching the gas-oil ratios closely. It is not necessary to know the exact level of the fluid in the well, because the gas-oil ratios are sensitive indicators of any change in fluid level. When gas-oil ratios are the minimum, the fluid in the well stands at the most suitable operating level, irrespective of the distance above the top of the sand.

Some operators control the migration of pressure by varying the volumes of gas which are injected into the input wells, and where by-passing is excessive by shutting in the wells to which the gas is migrating. As a last resort, after all other methods of controlling the migration of gas have failed, the location of the input wells or the ratio of input wells to producing wells is changed.

In an Old Property, Do You Consider It Advisable to Drill Additional Locations for Repressuring Operations? If So, Do You Use the New Locations for Pressure Wells or for Producing Wells? State the Reasons for Your Answer.

The majority of engineers are of the opinion that, ordinarily, the drilling of new wells on an old property for injection purposes is unnecessary and uneconomical, if the wells on the property are spaced with due consideration for the most economic drainage of the producing formation to permit selecting a sufficient number of the wells for injection purposes with a reasonable certainty that the injected air or gas will spread evenly throughout the oil bearing formation.

This hitherto unpublished picture of Clarence E. Olmsted shows the vice president and general manager of The Texas Co. of California togged out for golf play at the Los Angeles Country Club. Mr. Olmsted was an executive of the California Petroleum Corp., before its merger with The Texas Corp.

How Many Input Wells, or What Ratio of Key Wells, Do You Use for a Given Number of Producing Wells? Upon What Do You Base This Number?

The number of producing wells per input well depends upon the well spacing on the property that is being repressured, structural conditions, volume of gas available for repressuring, location of producing wells, sand conditions, productive capacity of the wells, water conditions, size of property, and economic conditions.

Many operators determine the most economical ratio of input well to producing wells by the cut and try method: adding and taking away pressure wells until the most economic ratio is found. In one field in the Rocky Mountain district, there is only 1 input well to 14 producing wells; and in many Mid-Continent fields and in one of the Eastern fields, the ratio is as high as 1 to 4. In general, in the Rocky Mountain, Mid-Continent, and Texas fields, the ratios of input wells to producing wells range between 1 to 5 and 1 to 8.

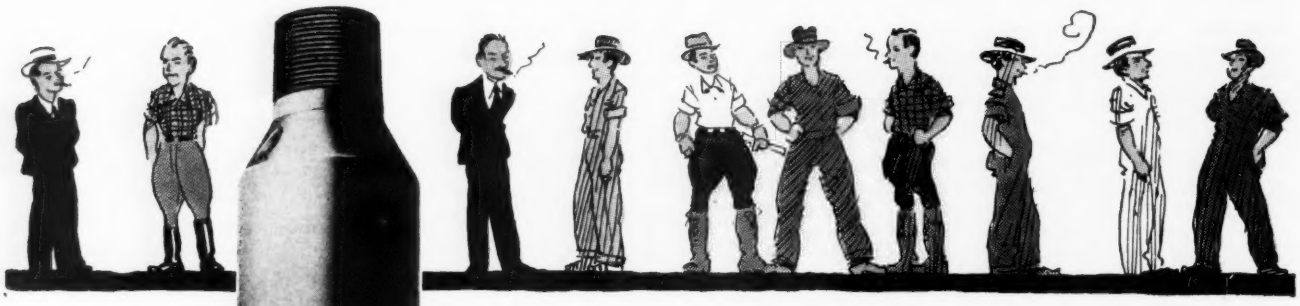
Should an Input Well Be a Small Well, or a Good Producer? Why?

Fifty per cent of the engineers who answered this question consider that good producers make the best input wells; 30 per cent prefer small producers; 10 per cent do not believe that the oil productive capacity of a well makes any difference, and 10 per cent replied that they had no substantiating data from which to draw conclusions as to the size of well best suited for an input well.

According to the 50 per cent, good producers are usually drawing their oil from loose porous sands which, during repressuring, will give a better distribution of gas and a larger percentage of oil extraction at lower injection pressures than tight and less porous sands, such as are found in wells of small producing capacity.

Those engineers who advocate using small producers for injection wells believe that the injection of gas directly into tight sands, which do not give up their oil as readily as looser sands, will open new channels in the tight sand areas through which the oil will travel. Furthermore, according to one engineer, it is easier to force gas through a tight sand than oil. From the standpoint of economics, it is probable also that small producers should be chosen for injection wells, thus keeping the good producers on production.

Engineers who are of the opinion that the size of the well should not influence the selection of injection wells believe that other conditions—principally the location of the wells with respect to structure, water en-



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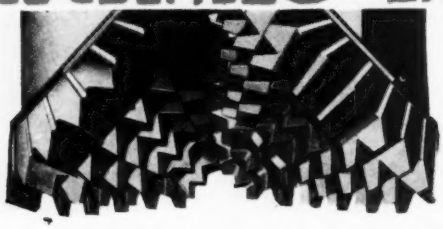

HUGHES TOOL COMPANY

Service Plants:
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TEXAS

Export Office:
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croachment, and property lines—should be the deciding factors.

What Do You Consider a Preferable Method of Cleaning Out an Input Well?

The favorite method of cleaning out input wells outside of California is by means of cable tools. The cable tool method is economical, and has the added advantage in that frequently input wells have to be plugged back or the pipe lowered, or perhaps other work must be done in the well to prepare it for injection purposes so that one rigging up of tools will suffice for cleaning out the wells and performing any other jobs that may come up at that time.

Bailing ranks second in choice as a method of cleaning out input wells. Other methods that are used in the Rocky Mountain, Mid-Continent, and Texas fields are: 1. swabbing, followed by bailing; 2. using a sand pump to lift the heavy cavings, following by washing out and bailing; 3. washing the hole with oil; 4. shooting, followed by bailing; and 5. blowing out by compressed air or gas.

In California, all wells are cased; and there is no open hole usually below the oil string, so that input wells seldom require cleaning out. What little sand and silt does accumulate in the bottom of the wells can usually be washed out with oil.

Old wells in tight sands and other hard formations, and wells in which the face of the producing sand is coated with paraffin or lime. should be shot prior to converting them into injection wells. Newly drilled wells, and wells draining unconsolidated sands, should not be shot. No input wells are ever shot in California and in parts of Texas where the wells are cased for their entire depth and the oil bearing formations are loose unconsolidated sands.

What Precautions Are Taken to Shut Off a Waste of Input Gas to Barren Upper Formations?

There is little likelihood that gas will escape into upper sands if the casing in the wells is tight, set above the top of the producing sands and below the barren formations, and securely cemented or set tightly in a suitable landing formation. It is often necessary to lower the casing in old wells and reseat or cement it so that gas will not migrate around the casing shoe and into upper barren sands.

Frequently, a string of tubing is run into the wells and a packer set and sometimes cemented below the barren formation. The space between the tubing and the casing above the packer is then filled with mud fluid.

No successful method has been found to prevent waste of gas into barren formations where wells have been shot and the barren formations are below the top of the shot hole. If the barren sands are above the top of the shot hole, in wells that have been shot carefully, it is usually possible to prevent migration of input gas to barren formations by using tubing and shot-hole packers.

What Methods and Equipment Do you Use to Measure Volume Injected and to Control the Same?

Recording orific meters in the gas lines to input wells are used by the majority of engineers to measure the volume of gas which is passing to the individual input wells. A few operators use an orifice in the gas lines and a manometer; and one operator in the Rocky Mountain fields meters the total volume of gas which is going to the repressuring system, and once a month measures the volume of gas going to each input well. Portable meters are used to obtain the individual well measurements of gas volume.

In small scale operations, one operator in California meters the total gas discharged from the compressor plant and calculates the volume distributed to individual wells from the rate of pressure drop in the wells when they are shut off from the repressuring system. This method of measuring gas volumes is entirely satisfactory insofar as gas volume measurements are concerned, but is objectionable in that the wells, which are left on injection while one well is off and is being tested, are subjected to abnormal conditions and, therefore, cannot be accurately tested until the distribution of pressure throughout the system is again normal.

A number of engineers control the volume of gas to input wells automatically, but the majority use manual means. Manual control is accomplished by opening and closing valves in the gas lines to the individual wells. Gate valves are generally used for controlling injection volumes, although needle valves are used in a few installations, and in certain others an orifice is placed in the line and small variations in pressure are made by means of gate valves. One operator controls the gas volume by opening and closing a ⅜-inch by-pass around the main gate valve in the gas line at the well. Regulating the speed of the compressors and opening and closing a valve in the suction line to the compressors, in addition to manual control of the gas passing through the individual lines to the well, are methods which one operator found entirely satisfactory.

Do You Prefer Operation Under Uniform Pressure Conditions or Uniform Volume Input Per Well? Give Reasons for Your Answer.

Sixty per cent of the engineers prefer to operate repressuring projects on a uniform volume input per well basis; 20 per cent operate under uniform pressure conditions; and the remaining 20 per cent either expressed no preference, and stated that they operate both ways or were of the opinion that each well in a repressuring project should be operated as an individual unit—basing the volumes injected and the input pressures on the results obtained in surrounding producing wells.

The distribution of gas is easier to control when uniform volumes are injected into input wells, and a better check on the migration of the gas is possible when uniform volumes of gas are injected into the wells than when uniform pressures are maintained. The producing sands are seldom uniformly tight or loose on the same property, and formation pressures vary over wide limits even in small areas, making it difficult to operate under the uniform pressure basis. Several engineers believe that there is a definite relationship between the volume of gas injected into reservoir sands and the amount of oil produced, and that in order to check and maintain this relationship, a uniform volume of gas must be injected into each input well.

What Is the Effect of Repressuring on Gasoline Production?

The principal effect of repressuring with gas on gasoline production has been to increase the daily production of gasoline. All but a few of the engineers reported that the gasoline content of the gas has been reduced by repressuring operations, but that the volume of gas from the producing wells has been increased enough to increase the total gasoline production above that recovered prior to repressuring.

What, in Your Opinion, is the Value of Injecting Liquid Fractions from Gasoline Plants into Input Wells for Oil Recovery?

Only fifteen engineers had information to offer in reply to this question, and the majority of them were of the opinion that liquid fractions from gasoline plants have a tendency to wash and clean the sand, raise the gravity of the oil, and lower its viscosity. The flow of oil to producing wells is stimulated when the viscosity of the crude in the reservoir sands is lowered, and there is usually an increase in oil production. On certain properties, the gasoline content of the output gas was maintained—and in some instances actually increased—when liquid fractions from gasoline plants were injected into the producing sands. The liquid fractions also dissolve paraffin and other heavy petroleum accumulations which tend to clog the drainage channels about producing wells.

Certain engineers, however, report that liquid fractions are too costly to inject into reservoir sands, and that they cause increased wear of compression equipment because they have a

harmful effect on the lubricating oil in compressor cylinders.

For over nine months a major California company has been injecting about 1,200,000 cu. ft. of propane-butane fractions a day under a pressure of 550 lb. per sq. in. into a well in the Long Beach field, and so far there has been no noticeable effect on the oil and gas production in the surrounding wells.

Do You Consider it Advisable to Return Wet Gas Without Extracting Any Gasoline?

Yes, 12; no, 6; questionable practice, 2; no data, 4.

Seven of the engineers who replied in the affirmative to this question are of the opinion, however, that where gasoline plants are available, the economics of the situation would enter into the question, and that perhaps it would be more profitable first to extract the gasoline—even though the injection of wet gas usually results in increased production of oil.

What System of Control do You Use to Prevent By-Passing of Gas from Input Wells to Producing Wells? For Wells Operating by Natural Flow, on the Beam, and Operating Off Central Powers?

By-passing of gas from input wells to producing wells, which are flowing naturally or by the gas lift, is controlled by placing back pressure on the casinghead of the producing wells, either by a restriction in the flow line from the well, or by maintaining pressure in the oil and gas separators. Occasionally, the volume of input gas is decreased, and sometimes it is necessary to change the location of the input wells.

Raising the fluid level in pumping wells, either by changing the length of pump stroke and the number of strokes per unit of time, or by raising the pump barrel, will increase the back pressure on the producing sands, and will usually prevent or control by-passing of gas from input to pumping wells. Intermittent pumpers should be pumped continuously in order to maintain a constant fluid head in the well.

The desired fluid level in a pumping well is maintained by suspending the pump barrel at such a depth that the fluid cannot be pumped down below a certain point. The location of flood nipples, and the point where the perforations in the tubing are set, will also determine and maintain the fluid level in the well. When the rate of flow of oil into a well is known, the rate of production is controlled so as to maintain a constant head of fluid in the well. Some operators suspend the pumps at such a depth that the wells pump off frequently at the desired level.

Have You Successfully Used the Gas Lift for Producing in a Field Where Repressuring Is Practiced? If So, What Disposition Has Been made of the Gas Used for This Purpose?

Yes, 8; no, 8; no data, 8.

Seven of the engineers who are using the gas lift in conjunction with repressuring operations remove the gasoline vapors from the gas, and use it again for gas lift and injection purposes. Excess gas is used for fuel purposes or sold. One engineer allows the gas from the gas lift wells to be blown to the air without attempting to extract the gasoline.

If a Field Is Under Vacuum and It Is Desired to Repressure, Should the Vacuum Be Discontinued Before or During Repressuring Operations, and Should It Be Discontinued at Once or Slowly? Give Reasons for Your Discussion

Before, 3; during, 4; no data, 17.

At once, 3; slowly, 13; no data, 8.

Whether to discontinue vacuum before or during repressuring operations depends mainly on the available fuel and gas supply and the status of the gasoline plant operations. When sufficient gas for fuel and repressuring purposes is available from wells which are not on vacuum, and there is no gasoline plant on the property, vacuum may be removed slowly before, or at the time repressuring is started, without seriously affecting the net revenue from the property. Vacuum should be discontinued at once when it is known that by the continuance of vacuum during repressuring operations the by-passing of gas from input to producing wells will be encouraged and there will be a non-uniform distribution of input gas through the producing sands.

In Your Experience, What Are the Beneficial and Detrimental Effects Caused By Shutting in?

Shutting in a property, while building up the pressure in the reservoir sands, allows the pressures to be built up rapidly and equally throughout the reservoir sands, and tends to cause the gas to migrate uniformly through the entire sand body. Frequently, the holding of back pressures or the maintenance of high fluid levels in producing wells will not prevent the input gas from by-passing directly to producing wells, so that beneficial results of repressuring can be materialized only by shutting in the producing wells and opening them again when the reservoir pressure has been restored.

Although shutting in a property frequently leads to greater recovery of oil; nevertheless, there are fields in which no gain in production was obtained when the shut in wells were opened up. Not only did the owners of these properties sustain a loss of production while the wells were shut in, but many of the wells had become sanded up and had to be cleaned out before they would again produce oil. It was learned also, when certain other wells were opened up after having been shut in for a time while pressure was being built up in the producing formation, that the drainage channels about the producing wells had become clogged with silt and fine sand which materially retarded the rate of flow of oil to the wells.

Shutting in a property for too long a period, or building up the pressures too rapidly and too highly, may drive the oil and gas to offsetting properties provided they are operating at a lower pressure. Very little information, other than casinghead pressures and volumes of gas injected is usually available while a property is shut in; and the operator often has no means of knowing whether or not his oil is being driven off his property. Furthermore, the operator of a shut in property must be prepared for an unknown amount of back pressure to prevent by-passing or waste of gas pressure upon opening up his shut in wells.

What is the Comparative Value With Respect to Increasing Production of: a., Air; b., Dry Gas; c., Wet Gas; d., Propane and Butane; e., Exhaust Gas; f., Hot Gas and Hot Air; g., Tail Gas from Refineries?

Following is a table showing the opinions of 13 engineers as to the comparative value of 7 different gases with respect to increasing the amount of oil produced in repressuring operations.

Comparative Value

	Choice						
Gas Used	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**
Air	4	..	4	2	2	..	..
Dry gas	2	8	2	1	..	..	..
Wet gas	7	2	1	..	..	..	..
Propane and butane	..	2	2	1	..	..	..
Exhaust gas	..	..	..	..	1	1	2
Hot gas and Hot air	..	..	..	1	..	2	1
Tail gas from refineries	..	..	1	..	1	1	1
No preference	..	1	3	8	9	9	9

Wet gas and air are considered by the majority of engineers as preferable to dry gas and other gases for repressuring purposes. Following are some of the arguments which were presented for and against the use of the gases listed in the question:

a. *Air:* Slightly better propelling medium than dry gas, but causes excessive corrosion of well equipment. In old fields, air is usually the only gas available. Air-gas mixtures, however, are highly explosive.

b. *Dry gas:* Does not corrode the equipment in the well. Gasoline plant recovery is not affected as it is when air is used. Gas is usually available and relatively inexpensive, except possibly in old fields.

c. *Wet gas:* Ultimate recovery will be greater when wet gas is used than when either air or dry gas

is injected into reservoir sands. Whether or not it is economical to inject wet gas, with its valuable gasoline vapors, must be considered when comparing the value of wet gas to air or dry gas as a repressuring medium.

d. *Propane and butane:* This gas will probably wash the sands clean of oil, and increase ultimate recovery from reservoir sands above that obtainable by other gases, but usually sufficient quantities of propane and butane are not available to repressure extensive areas.

e. *Exhaust gas:* This gas will cause less corrosion of well equipment than air, but otherwise has no advantages over air as a repressuring medium.

f. *Hot gas and hot air:* Raising the temperature of the input gas and air will probably result in a recovery of larger volumes of oil than when cold gas or cold air is used as the injection medium, but it is not economical usually to go to the expense of heating gases for injection purposes.

g. *Tail gas from refineries:* This gas may be used to advantage where refineries are in close proximity to oil fields. It is probably equal to dry gas as a medium for repressuring purposes.

What Has Been the Actual Effect of Air Repressuring on Gasoline Extraction from the Gas Produced?

Repressuring with air lowers the gasoline content of the output gas, but does not materially affect the gross gasoline recovery of the plant, because the volume of gas treated is increased when a property is repressured. However, the efficiency of the extraction of gasoline from air-gas mixtures is less and the residual gas contains a larger percentage of gasoline than when straight gas is treated for its gasoline. Furthermore, the compression of air-gas mixtures is hazardous, and the corrosion of gasoline plant equipment is accelerated when air-gas mixtures are treated.

What Determines Whether Air and Gas Should be Used?

Gas should be used in preference to air for repressuring purposes wherever sufficient quantities of gas are available at a reasonable cost. According to one engineer, a reasonable cost of gas for repressuring purposes is 15 cents, or less, per 1000 ft.

What Effect Have You Observed in the Lifting Cost Per Barrel of a Property, Considering Increased Production After Repressuring Operations Have Been Applied?

There is usually a temporary increase in lifting costs when a property is first placed on a repressuring basis, which is followed by a decrease in lifting costs as soon as the rate of oil production increases.

Lifting costs on repressured properties are frequently 20 per cent below normal; and one engineer stated that in pools where normal production is relatively small and lifting costs high, repressuring results in a 50 to 75 per cent decrease in unit lifting costs. In the Eastern fields, the total lifting costs on repressured properties are from two to three times the normal cost; but because from four to eight times more oil is produced by repressuring operations, the unit lifting costs are materially less than they are on properties where repressuring is not in effect.

From Results Obtained in Repressuring, What Ultimate Increase in Recovery Do You Think Will Be Possible from Various Types of Operating Properties, and What Total Percentage of the Oil in the Formation Do You Think Can Be Recovered Under Best Conditions of Repressuring?

Estimates on the ultimate increase in recovery by repressuring over normal producing operations vary from 10 to 300 per cent. However, the majority of engineers believe that from 10 to 30 per cent—and possibly as much as 50 per cent—more oil will be recovered by repressuring a property than would be recovered if normal operations had been continued. According to several engineers, if the pressure in a producing sand is maintained by injecting gas back into the formation during the field's flush production stage, ultimate increase in recovery by repressuring will be from 20 to 40 per cent—and possibly as high as 100 per cent—greater than if the pressure had not been maintained and the field operated normally or repressured during its later life.

Under ideal conditions of repressuring, it is estimated that up to 75 per cent of the total oil content of the sand may be recovered.

How Do You Determine What Size Plant to Install in a Given Property for Repressuring Operations? On What Basis Do You Estimate the Amount of Gas Required for Nominal Increased Barrels of Oil Produced?

A study of the thickness of the producing sands, kind of sand, degree of saturation, formation pressure, past oil and gas production, and the probable area drained up to the time that repressuring operations are to begin will give valuable information on which to base the size of the plant required. Many operators also make preliminary tests with portable compressors to determine how much gas can be forced into the input wells, and at what pressures.

One engineer estimates that each injection well on the producing properties over which he has supervision will take from 100,000 to 150,000 cu. ft. of gas per day, and constructs his plants accordingly. The engineers of a major company operating in Texas make preliminary tests with portable compressors to determine the injection pressure, and then arbitrarily assume the figure of 10,000 cu. ft. of gas per day per foot of oil sand to determine the volume of gas to be injected initially into each input well. The volume per well is multiplied by the number of input wells to give the total volume of gas required. Compressor plants are then constructed on the basis of the computed total volume required.

The amount of gas required per additional barrel of oil produced by repressuring operations varies between wide limits. Certain engineers have found that 300 to 800 cu. ft. of gas will produce an additional barrel of oil; whereas one engineer in the Rocky Mountain fields estimates that approximately 11,000 cu. ft. of gas are required to drive a barrel of additional oil to the producing wells. The operations of one company in Texas show that 333 cu. ft. of gas produced a barrel of additional oil on a property which had formerly been under vacuum; whereas a property which had never been on vacuum required 2000 cu. ft. of gas per barrel of additional oil recovered. This company's average for all repressuring operations is approximately 1350 cu. ft. of gas per barrel of additional oil produced.

In an Eastern field, 4000 cu. ft. of gas are required for each barrel of oil produced.

Do You Consider it Advisable to Make Preliminary Tests in Repressuring Operations With Portable Equipment for a Period of Time to Determine the Operating Characteristics of the Structure, Before Proceeding With a Permanent Plant Investment? If so, Describe the Procedure You Have Used

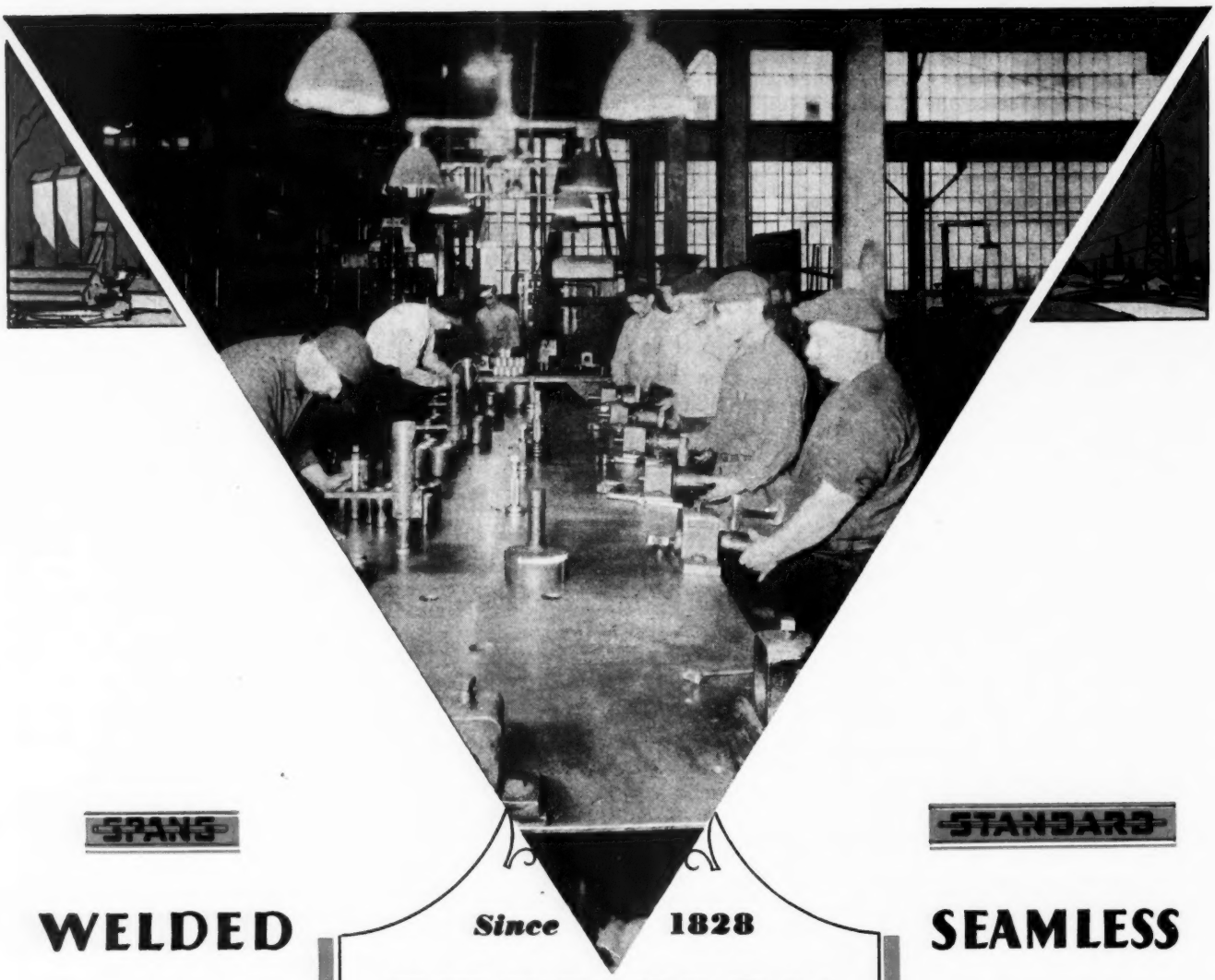
Yes, 19; not usually necessary, 2; no data, 3.

Portable compressors capable of compressing from 100,000 to 500,000 cu. ft. of gas a day to pressures up to 500 lb. per sq. in. are used to make preliminary tests before proceeding with the construction of permanent compressor plants. The compressors are moved about the field from one contemplated input well to another, and generally sufficient data are obtained in one or two weeks to allow forming conclusions as to the probable pressure and gas volume requirements of the property.

Certain engineers make preliminary tests only in untried territory where sand conditions are unknown; and two engineers are of the opinion that preliminary testing is not necessary usually, and is uneconomical unless a large property is to be repressured.

What Will be the Operating Cost on a Barrel Basis, and What is the Cost of Compressing 1000 Cu. Ft. of Gas to the Several Pressures Required for Repressuring Operations?

The operating cost per barrel of oil produced by repressuring varies



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widely; and depends, mainly, on the cost of compressing air or gas to the required injection pressures, the volume of air or gas that is required to bring a barrel of oil to the producing wells, the cost of the gas, the cost of lifting a barrel of oil to the surface, and the cost of the labor which is required to maintain producing operations. Operating costs on repressured properties are higher usually than on normally operated properties; but the higher production due to repressuring compensates to a degree for the increased total operating cost as compared to the cost on properties that are not repressured.

Three engineers operating in widely separated parts of the United States ventured an opinion as to the cost of producing a barrel of oil on repressured properties. The Eastern engineer reported that it cost his company 40 cents a barrel; the Mid-Continent engineer reported that his costs were in the neighborhood of 5 cents a barrel; and the engineer from California was of the opinion that 8 cents would cover the operating cost per barrel of oil produced by repressuring on his properties.

The cost of compressing 1000 cu. ft. of gas depends mainly on the pressure to which the gas is compressed, the type of machinery used, and, to some extent, on the size of the plant. Cost figures, like bonds, are dangerous to handle unless one knows exactly what is included in arriving at the final figure. For example, a Mid-Continent engineer reported that it costs 7 cents to compress 1000 cu. ft. of gas to a pressure of 400 lb. per sq. in. on his property; where as on the other hand, a California engineer compresses gas to 800 lb. for 4 cents per 1000 cu. ft. No doubt both engineers are correct, but such figures mean little or nothing without more detailed information as to just what they include.

The cost figures for compressing 1000 cu. ft. of gas to several pressures which were submitted in answer to the second part of Question No. 56, are:

Pressure Lbs. Per Sq. In.	Cost Cents Per M Cu. Ft
50	2
50	2
100	2½–3
200	4–5½
300	2–6
400	3½–7
500	6
700-800	4–4½

Do You Prefer a Header at the Plant With Separated Lines to All Input Wells or a Distribution Loop With Branches?

Header system 9; loop system, 10; no data, 5.

The loop system for distributing gas to input wells is preferred by some engineers, because the installation cost is less than that of a system which is made up of separate lines to each input well from a header at the compressor plant. Several engineers are of the opinion also that there is less trouble due to freezing of controls on low pressure wells when the loop system is used. On the other hand, the volume of gas, and the pressure at which it is injected into input wells, can be controlled more efficiently when a header with meters and control valves on the lines to the input wells is installed at the compressor plant.

A direct discharge line from the compressor or compressors to each input well is recommended when injection pressures are greater than 800 lb. per sq. in. The control of high pressure gas by means of valves is difficult and hazardous, and gas under high pressures cannot be metered satisfactorily—so that it is desirable to connect compressors directly with high pressure injection wells. The gas to the high pressure input well can then be controlled and metered at the suction end of the compressors.

When certain wells take gas at pressures considerably higher than others in the same systems, direct lines from separate compressors to the high pressure input wells permit of the most economical operation. There is a waste of power when all the gas is compressed to the pressure of the highest pressure input well, and most of it is then allowed to expand to the low injection pressure of a number of other input wells.

What Measures Do You Take to Prevent Freezing Difficulties in Winter Time?

After coolers, electric heating units around the points of freezing, gas heaters and steam heated boxes on the gas lines, drips, alcohol lubricators, insulating the gas lines, and burying the lines are methods which are used and measures which are taken to prevent freezing difficulties in the winter time.

Do You Know of Any Cases Where Repressuring or Pressure Maintenance Has Been Harmful? If so Describe.

Yes, 7; no, 14; no data, 3.

Decrease in oil production, increase in gas and water production, water driven to a water dry producing well, increase in emulsion and forcing silt into producing wells, together with increased corrosion troubles sufficient to offset the gain in oil production when air was used as the repressuring medium, are the harmful effects which were listed by the engineers who have at times experienced adverse results in repressuring and pressure maintenance operations.

Do You Feel That Repressuring and Pressure Maintenance Should Be Confined to Formations of Any Particular Depths? If so, What Are the Limits?

The depth of the producing formations has no particular bearing on the success or failure of a repressuring or pressure maintenance project. The injection pressures required and the equipment available to produce and handle the required pressure are the factors which determine the depth of the formations that can be repressured.

What Types of Formation Have You Successfully Repressured?

Sand, sandstone, conglomerate, porous lime and dolomite formations have been successfully repressured. The experiences of the majority of engineers have been mostly with sands and sandstones.

Have Thick Sand Bodies, With Upper Gas Sands Exposed, Been Successfully Repressured? If So, To What Do You Attribute the Increase in Production: a. Drive; b. Pressure Effect Upon Viscosity; c. Frictional Effect Between Gas and Oil; d. Recovery of Additional Natural Gasoline?

Yes, 12; no, 1; no data, 11.

Success attributed to drive, 8; pressure effect upon viscosity, 1; frictional effect between gas and oil, 1; combination drive and pressure effect upon viscosity, 1; all factors listed, 1. In addition, four engineers attributed the increase in production also to the recovery of additional natural gasoline.

What Effect Has Repressuring Had Upon the Gravity of the Oil? With a. Dry Gas; b. Air; c. Wet Gas?

Dry gas	Increase	2
	Decrease	5
	No effect	6
Air	Increase	1
	Decrease	8
	No effect	4
Wet gas	Increase	11
	Decrease	0
	No effect	2
Incomplete or no data		11

According to several replies, the observed increase or decrease in the gravity of the oil has never been more than 1 deg. A.P.I., regardless of the kind of gas used.

Has Underground Storage of Gas Been Successful? What Percentage Is Recoverable?

Yes, 10; no data, 14.

Underground storage of gas in depleted gas sands has been successful in several Eastern fields. Experiments that are now being made in other sections of the United States, mainly in California, indicate that a considerable volume of gas can also be stored in depleted oil sand reservoirs. According to Meals,[4] "the largest gas storage field of which we have knowledge is located in central Kentucky. The formation in which the gas has been stored is found at a depth of 1000 ft., and covers an area of about 27 square

[4]S. W. Meals, The Underground Storage of Gas, *Natural Gas*, vol. x, No. 10, p. 8 (Oct. 1929).

miles, with about 80 wells. The gas is metered as it is injected into the sand. It requires 218,000,000 cu. ft. to raise the rock pressure 1 lb.; and if this amount is withdrawn, it reduces the rock pressure 1 lb. About 8,000,000,000 cu. ft. of natural gas have been stored in the reservoir under a pressure of 70 lb. per sq. in."

Storage of natural gas in a depleted gas sand reservoir in the Zoar field, 30 miles south of Buffalo, N. Y., has likewise been successful. It is stated in a cooperative report[5] between the Bureau of Mines and the City of Buffalo, that "by 1918 the pressure had decreased to a point where the field was putting but little gas into the main line, against a line pressure of about 90 lb. per sq. in. Under these circumstances, the experiment was tried of turning the high pressure gas from the wells of Collins and North Collins into the 'sand' through one or more of the old wells. The gas was metered in, and the following winter all of the 45,000,000 cu. ft. stored was recovered as needed. The highest amount thus far stored was 350,000,000 cu. ft., all of which was recovered with some 40,000,000 cu. ft. additional."

A gas company utilizes a structure in one of the San Joaquin Valley fields in California as a reservoir in which to store natural gas during the summer months, when the demand for gas is at a minimum. Gas is withdrawn as needed during the winter months, when the demand exceeds the normal production of the fields that are connected to the company's gas gathering system. Large volumes of gas have also been stored underground in the Dominguez and Brea-Olinda fields in southern California; but the success of the projects, as far as the storage of surplus natural gas is concerned, cannot be determined until efforts are made to recover the injected gas.

The percentage of gas recoverable from depleted oil sand reservoirs is questionable at the present time; but it is reasonable to suppose that from 80 to 90 per cent—and possibly all—of the injected gas can be recovered eventually and economically by efficient producing methods.

CONCLUSIONS

It was evident from the number and nature of the replies, which were received in answer to the questionnaire on air and gas injection for maintaining pressure and repressuring in oil producing properties, that engineers and operators throughout the oil producing districts of the United States are deeply interested in the experiments which are being made and the results that have been obtained by injecting air and gas into reservoir sands. The oil industry generally has observed the favorable results which have been obtained by pressure maintenance and repressuring operations; and in the future will witness continued—and perhaps phenomenal—broadening of gas injection methods into fields that are now producing by other methods.

Different methods have been, and will continue to be, applied to different fields. The results in the past although generally quite favorable, have not always been the same. The replies to the questionnaire show that there is a diversity of opinion on many of the important phases of air and gas injection practice, and they indicate the need for further study. There is still a great deal to learn about gas injection methods, and every engineer and operator in the oil fields should place his shoulder to the wheel and assist progress by collecting and disseminating information which will be valuable to other engineers and operators. It is hoped that this symposium will show the urge for the collection and dissemination of additional and detailed information on the important subject of air and gas injection in oil producing properties.

[5]G. S. Brewer and Benjamin Joy Hatmaker, A Fuel Program for the City of Buffalo, New York; published by cooperative agreement between the Bureau of Mines (Dept. of Com.) and the City of Buffalo, N. Y. (1923).

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Company	Office Address	Data Compiled or Sent in By:
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Gypsy Oil Co.	Tulsa, Okla.	David L. Trax.
Simms Oil Co.	Shawnee, Okla.	B. A. Cunningham, Jr.
Reiter-Foster Corp.	Tulsa, Okla.	F. W. Shelton.
The Texas Co.	Tulsa, Okla.	E. R. Filley.
Continental Oil Co.	Ponca City, Okla.	E. O. Bennett.
Carter Oil Co.	Tulsa, Okla.	Lee S. Miller.
Sinclair Oil and Gas Co.	Tulsa, Okla.	R. M. Carr.
Barnsdall Oil Co.	Tulsa, Okla.	David G. Hawthorn.
Skelly Oil Co.	Tulsa, Okla.	J. R. McWilliams.
Phillips Petroleum Co.	Bartlesville, Okla.	E. F. Guidinger.
Humble Oil and Refining Co.	Houston, Tex.	W. W. Scott.
The Texas Co.	Fort Worth, Tex.	L. E. Barrows.
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Vacuum Oil Co.	Houston, Tex.	W. C. Thomas.
Sun Oil Co.	Dallas, Tex.	J. Edgar Pew.
Saxet Oil Co. / Fain-McGaha Oil Co. — Joint report	Petrolia, Tex. / Wichita Falls, Tex.	George M. Kirkwood. / E. V. Foran.
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The Texas Co.	Los Angeles, Cal.	E. L. Davis.
Shell Oil Co.	Los Angeles, Cal.	E. W. Masters and H. T. Wyatt.

Hoover Suggests Grouping Conservation Work

WASHINGTON, D. C. Dec. 5.—Concentration of all governmental activities on conservation of natural resources under one head was recommended by President Hoover in his message to congress Dec. 3. The reappropriation by congress of $22,220 of the original $50,000 appropriated for the Federal Oil Conservation Board, was recommended in the President's budget message.

Conservation of natural resources at present is scattered among eight agencies in five departments. The President recommended concentration of these activities under an assistant secretary of conservation. The department or cabinet officer under which this secretary would function is of secondary importance, he said.

The balance of the Conservation Board's re-appropriation would be used in the coming year, the President said, and no suggestions were made for the future. In January, 1925, an appropriation of $50,000 was made for the Board, and the $22,220 is the unexpended balance.

"The working of the oil permit system in development of oil and gas resources on the public domain has been subject to great abuse," he said in his message to congress, "I consider it necessary to suspend the issuance of such permits and to direct the review of all outstanding permits as to compliance of the holders with the law. The purpose was not only to end such abuse but to place the government in position to review the entire subject."

* * *

WASHINGTON, D. C. Dec. 6.—"Estimates vary but those expert in the field expect our present volume of oil production to last less than a decade," so Dr. Ray Lyman Wilbur, secretary of the interior, told President Hoover in his annual report. Petroleum is our fastest dwindling irreplaceable asset, he said.

The Kettleman Hills oil field, in California, was pointed to by the secretary as an example of the department's policy in handling conservation. "The present policy will be continued," said Dr. Wilbur regarding the policy of President Hoover of March 12 when he announced that no more permits to prospect for oil and gas on the public domain would be issued.

Mud Fluid Pressure in Bottom Joints Help Keep Hole Straight

By J. T. Hayward*

(Presented before American Petroleum Institute, Chicago Dec. 3-5)

GREAT progress has been made during the last few years in the technique of drilling straight holes and detecting crookedness when it occurs. Nevertheless a lot remains to be done and the tendency of the drill to deviate from the vertical requires constant vigilance, and often results in carrying weights on the bit considerably less than those that would be used if maximum footage was the only concern.

It is herein submitted that the mud fluid pressures in the bottom joints of the drill pipe play an important part in keeping the hole straight and to a certain extent govern the weight that can be safely carried on the bit during drilling. The fluid pressure referred to here is, of course, the difference between the pressure in the drill pipe and that outside it at the same level. This differential pressure it is suggested has a stiffening effect on the pipe that may prove to be of considerable importance.

The ratio of the diameter of a string of 6-inch drill pipe to its length in a 5000-foot hole is as 1 to 10,000. A column of such a diameter to length ratio would tend to buckle under compression even of the lightest nature, and that a straight hole should ever be drilled with such a drill would, at first sight, appear to be surprising. It is suggested that it would in actual practice be very difficult and that the hole would be liable to go crooked whenever there was any compression in the bottom joints.

The cross sectional area of 6⅝-inch drill pipe, minus the water courses in the bit is roughly 27 square inches. Considering the case of an 11-inch bit, drill collar, etc., and a mud fluid pressure of 290 pounds per square inch at the bit acting on the cross sectional area mentioned above, there would be a tension of 10,000 pounds in the last joint of the drill pipe, when the bit was just off bottom. A pressure of 10,000 pounds could therefore be put upon the bit without putting the drill pipe in compression.

There did not appear to be much reliable data available regarding the differential pressure at the bit. Pressure records at the pump are obtainable but the friction losses in and outside the drill pipe were not known. The differential pressure of 290 pounds per square inch assumed in the last paragraph was calculated from the pump speeds observed at a number of wells and the known diameter of the water courses in the bit.

Recently the writer carried out a number of tests on a well belonging to one of the major operating companies in the Mid-Continent field and which were designed to determine friction losses in the drill pipe and the actual differential pressure at the bit.

The method adopted to obtain these pressures was as follows: The hole was filled up and the bit, drill collar, and a stand of pipe run into it. The slush pump was then started and the fluid pressures corresponding to the various pump rates noted.

Neglecting the losses in the hose and drill stem which are in any case small in proportion, these pressures are those required to force the liquid at the various rates through the water courses in the bit, and when the bit is near bottom or drilling the differential fluid pressure across it should not differ much from that found in the above manner for the same rate of circulation.

The same procedure was followed at 1500, 3000, and 3830 feet as a check and to obtain the frictional

*Consulting engineer, Tulsa.

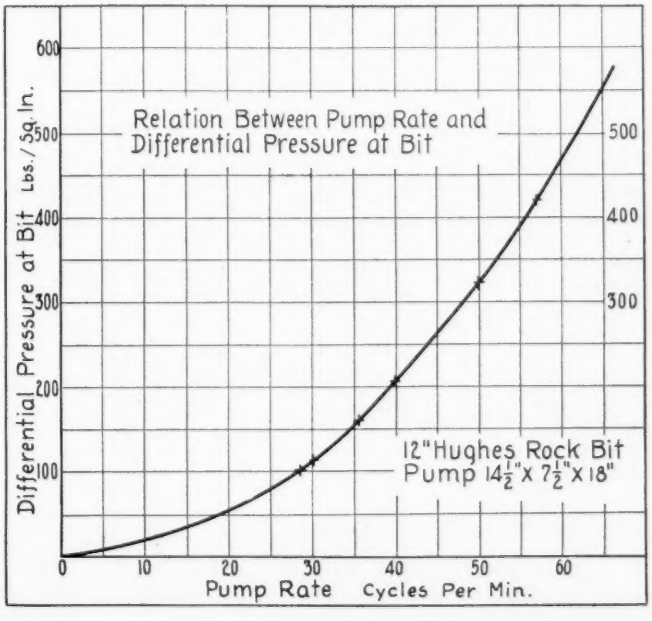

Fig. 1

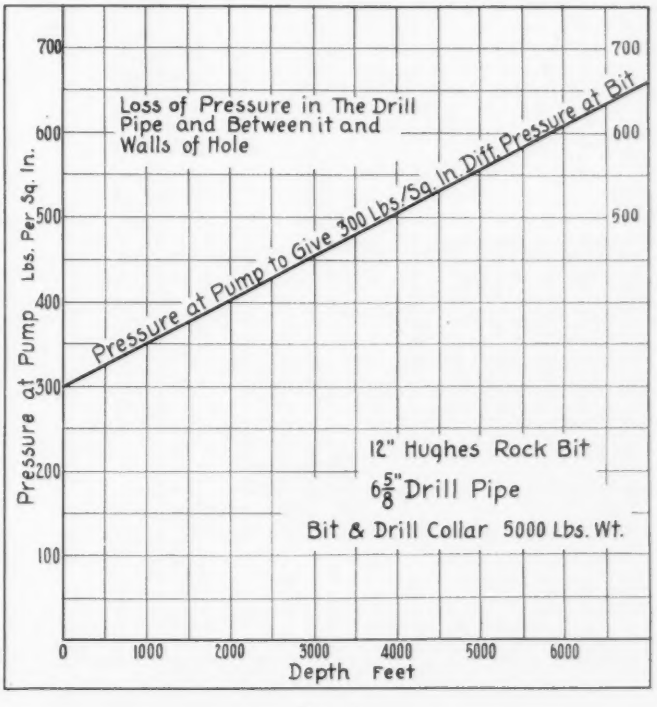

Fig. 2

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losses in the drill pipe and the hole. The graph Fig. 1 depicts the differential pressure at the bit at various pump speeds. The pump was 14½ x 7½ x 18 inches in good condition and the bit was a 12-inch Hughes Rock Bit. This graph can of course be used in any case with a bit and similar water courses and gives the differential pressure at the bit independently of the depth, the drill pipe or the size of the hole. The characteristics of the mud fluid would affect the figures to some extent and the actual weight of the mud used was not obtained but it was fairly thin.

The graph Fig. 2 depicts the pressure that would have to be put up by the pump in order to maintain 300 pounds per square inch differential pressure at the bit and which would require a pump rate of 48½ complete cycles per minute. The graph refers to the same bit and pump dimensions as those previously given and the drill pipe was A.P.I. Seamless Interior Upset Pipe, I.D. 5.96 with a nominal weight of 25.20 pounds per foot and with a tool joint on every length.

The hole was 12 inches. The weight of the bit and drill collar at this well was about 5000 pounds submerged, and with the above pump rate and differential pressure, 13,000 pounds weight could be put on the bit without putting any compression in the bottom joint of drill pipe. In the same manner at 4000 feet a pressure at the pump of 507 pounds per square inch would be required and 560 pounds per square inch at 5000 feet.

Pump pressures in the Oklahoma City field range during drilling from 500 to 900 pounds per square inch at the pump and it appears, therefore, that it is quite practical to drill with 6⅝-inch pipe to 5500 feet while maintaining some tension in the last joint of pipe and still putting a reasonable weight on the bit.

The writer has not found any records correlating the straightness of the hole with the weight on the bit and the differential fluid pressure at the bottom. The present is a plea for the inclusion of the differential fluid pressures with the other data collected during investigations on the straight-hole question.

Assuming the correctness of the hypothesis outlined earlier, namely, that it is possible and desirable to drill without putting compression in the lower end of the column of drill pipe, a number of modifications in the equipment suggest themselves. It would, for instance, be important to keep the fluid friction in the drill pipe to a minimum by making the holes through the tool joints as large as practical, and possibly also stream line them so as to lose as little of the pump pressure as possible between the surface and the bit.

The usual drill collars have an internal diameter smaller than that of the pipe and cause a part of the hydraulic pressure to be applied on a cross section some distance above the bit. For straight hole drilling it would appear desirable to apply the pressure at the lowest practical point, for which purpose a short section in the bit itself, or in the lower end of the drill collar, might be recessed out to a diameter as nearly equal to that of the inside of the pipe as possible.

Again, the larger the internal diameter of the lower 200 or 300 feet of drill pipe the greater the weight that could be put on the bit with any given differential fluid pressure without putting the drill pipe into compression. This condition would point to large diameter pipe with flush jointed internal couplings for the bottom stands.

The outside diameter of the standard 6⅝-inch couplings is 7¾ inches, and without exceeding this figure it should be practical with flush jointed pipe to attain an internal diameter of 7 inches. With 200 feet of this pipe the differential fluid pressure of 300 pounds per square inch and 2200 pounds due to the weight of the bit and drill collar it would be possible to put a weight of 13,000 pounds on the bit without putting any compression in the drill pipe.

While high differential fluid pressures, may, for the reasons outlined above, prove to be desirable in the lower end of a string of drill pipe, they are certainly detrimental in the upper end. The dead weight loads for instance on a 5,000-foot string of 6-inch pipe may be increased by more than 30 per cent by the mud fluid pressure put up by the pump.

Increasing depths will probably direct efforts to decreasing the additional tension in the pipe joints due to the fluid pressure and enable greater depths to be attained without increasing the total load on the joints but at the same time maintaining the straight hole drilling effect of high differential fluid pressures at the bottom.

Great Strides Made in Combating Corrosion

CHICAGO

"THE metal is yet to be found, if at all, that will answer all the corrosion problems," says R. L. Duff of the Standard Development Company in his paper on "Practical methods of Combating Corrosion in Oil Refining Equipment," presented before the corrosion of equipment section of the American Petroleum Institute. "There is no cure-all, but the art of alloying various metals is progressing rapidly, and great strides are being made in combating corrosion by the use of alloys for specific service conditions."

The author divides materials used in building refinery apparatus into three types, base metals, alloys and special coatings, and discusses at some length the general conditions under which each type may be profitably used. Base metals, such as iron, plain steel, copper, etc., have only a limited application as corrosion resistant materials, and are used where extremes of heat, pressure, corrosive fumes, or atmospheric conditions are not found.

Even under apparently mild conditions wide variation in the service obtained from such materials occurs, cast iron submerged in sea water in two different localities giving four years service in one case and only six to eight months in another.

Ferrous alloys of different types have given excellent satisfaction under the widely varying conditions of corrosive action found in the refinery, yet the material best suited for the specific purpose must be determined by trial and experiment. Straight 18 per cent chromium alloy is very resistant to certain corrosive conditions, but becomes very brittle under continued heating and therefore is not suitable to use in pressure vessels subjected to high temperatures for long periods.

Such conditions are met very much more successfully by chrome-nickel alloys of the austenitic type, according to the writer. These materials are however very subject to abrasion and deformation, due to their great ductility. The advantage of this metal in pressure stills was recently demonstrated by a test conducted for the Institute in which 18 per cent chromium-8 per cent nickel alloy gave the best results under conditions where plain carbon steel lost as much as 54 per cent by weight after 1031 hours exposure.

Conditions existing in a fire box require an alloy higher in nickel, sometimes as high as 35 per cent, in order to resist the scaling and oxide forming tendencies at the high temperatures prevailing.

The author further states that aluminum, alloyed with silicon and other materials to impart greater strength, has been used in some cases, but that the best conditions for its use are not yet fully determined.

Coatings of materials such as lead, copper, tin, and non-metallic substances as concrete have been applied with good results to equipment where abrasive action is not great. The Schoop method of applying molten

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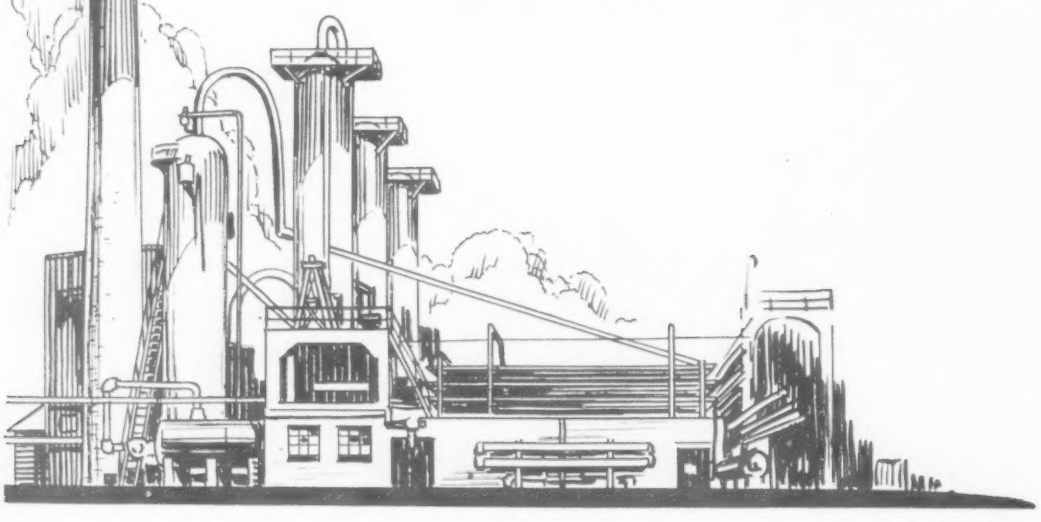

metals to surfaces produces a resistant coating when the metal is laid on fairly thick, but in thin coats is liable to show sponginess and consequent local action on the base metal, according to the author.

Numerous other types of alloys and coatings were discussed by Mr. Duff, with their application to specific conditions. Along this line he says: "In the selection of materials caution must be used in accepting the statements of those exploiting the article. Cases of misrepresentation occur more often through lack of knowledge regarding the product and service conditions rather than deliberate attempts to mislead. . . .

"Many materials are being offered to the consumer that are designed for certain conditions, and their increasing number in turn demands more tests to find the most efficient. . . .

". . . To obtain some indication of corrosion effect on different metals a long time corrosion test is being conducted, containing specimens of 108 different materials placed at ten locations as representative of refinery conditions."

Power Costs and Solvents Big Problems In Producing Low Pour Point Oils

By E. R. Lederer* and R. Beattie*

(*Presented before American Petroleum Institute, Chicago, Dec. 3-5*)

THE phenomenal growth of aviation, making it possible for a plane to leave a temperate zone and the same day land in a frigid zone together with the constantly increasing use of automobiles in winter, has led to improved dewaxing methods. The usual practice in the manufacture of paraffin base motor oils had been to blend a cold settled bright stock with a pour from 40 to 60 F. with a neutral produced from a wax distillate partially dewaxed by pressing. The pour point of the neutral ranged from 20 F for a single pressed to as low as 0 F. for a double pressed product. The resultant pour point of the blend usually ran from 20 to 50 F. The newer methods give bright stocks with pours between 20 and 10 F. with therefore correspondingly lower pours on the blend.

Centrifugal Wax Separation

The general procedure followed in the manufacture of Sharples bright stocks is as follows: The stock to be dewaxed is blended with naphtha in about a 30-70 mix in the order named. Characteristics of the naphtha vary according to the specific requirements of the stock being processed. Narrowness of distillation range seems to be the characteristic that affects economical operation the most. The end point should be below 400 F. to insure high gravity of the solution and the initial fairly high to avoid evaporation losses as much as possible.

The theory upon which this system of separation is based demands a differential in gravity between the precipitated wax and the solution from which the wax has been precipitated. The determination of this differential and the magnitude of it depends on the gravity of the naphtha used and the characteristics of the stock being dewaxed.

Just as in cold settling, the greater the tendency of the wax to settle, the more wax removed under given conditions, in the Sharples Centrifuge, the greater the gravity differential the more separation occurs under given conditions.

After blending the solution is chilled comparatively slowly. From the blending temperature of from 100 F. to 110 F. down to 20 the hourly decrement varies from 3 to 5 F. from 20 F. down to the final temperature (from —20 F. to —50 F.) the chilling rate may be increased considerably. After reaching the final temperature the solution is fed continuously to the centrifuges.

The essential feature of centrifugal separation of the wax from the lubricating oil is the continuous discharge of wax from the machines and for this purpose a special rotor has been constructed. Hot water at a temperature of 140-145 F. is fed by jets into the head of the machine. The water being heavier than the wax or oil maintains itself as a flexible carrier in the form of a cylindrical layer on the periphery of the rotor of the machine.

The stiff wax is deposited upon the surface of the water which conveys the wax from the machine, thus insuring a complete and continuous separation of the wax from the oil. Anything that will prevent or retard this continuous discharge of wax, such as insufficient water, clay or other foreign particles, will have a very marked effect on the resultant pour test of the wax free lubricating oil.

In order to produce sub-zero pour tests by centrifuging, conditions in the plant must be ideal. Extreme care must be taken in reducing to avoid cracking. Tar and asphaltic bodies must be removed in which are included the inhibitive or protective colloids which tend to keep the wax in solution.

Each centrifuge in the battery must be watched with extreme care, as the effect of one stream running high cold test makes a very marked effect in the aggregate. Special attention must be given the nature and quality of the solvent used. If contact or percolation filtration is employed before dewaxing, the complete removal of "fines" is compulsory or the resulting deposit in the centrifuge bowls make low pour test impossible.

It has been our experience after considerable work that the ultimate pour test obtainable by centrifuging a 90 viscosity at 210 stock is —10 F. This is accomplished by using a special naphtha as a solvent and chilling the solution to —50 F. This latter temperature is considered for the present by the authors as the lowest possible obtainable for economic operation.

A lower pour test, however, was obtained by altering the construction of the machine, so as to apply enough refrigeration, as near the bowl as possible, to offset the heating effect due to slippage and turbulence of solution in the bowl itself. Whether or not this problem can be worked out on a practical scale remains to be seen.

Weir Process

As it was the object of our research to determine the most economical way of producing sub-zero pour oils, we did not stop at the perception that the desired result could be obtained by centrifuging alone. The next step was to investigate the Weir Process, which lately has undergone considerable testing by many companies. The principle employed in wax separation in the Weir Process is very simple in the words of Janus W. Weir in NATIONAL PETROLEUM NEWS, March 31, 1926.

"There is nothing mysterious about

*Texas Pacific Coal and Oil Company, Fort Worth, Texas.

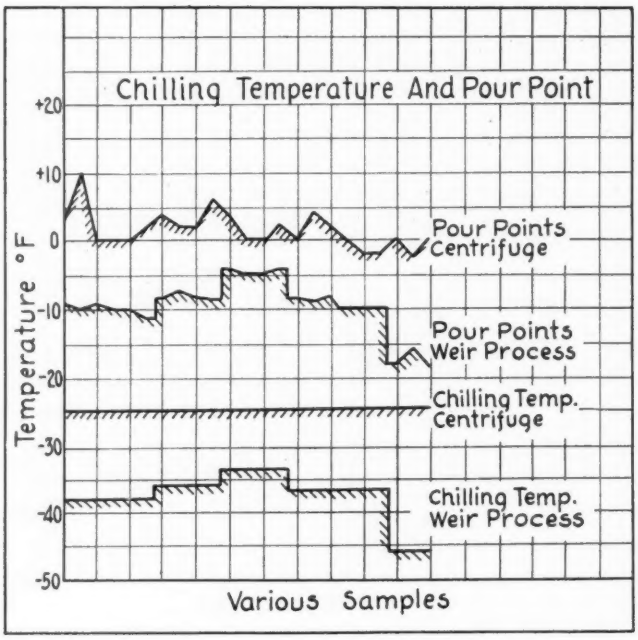

Fig. 1

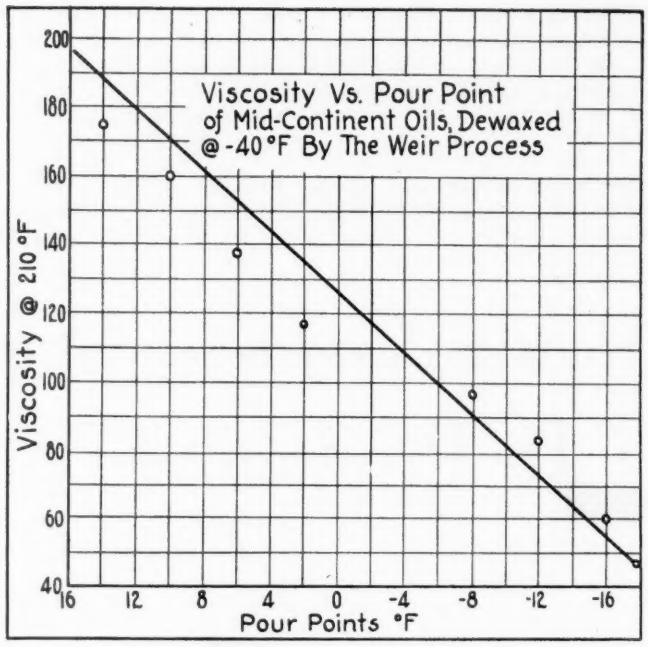

Fig. 3

the process which consists of changing the filter cake from an impervious mass to a porous substance in the filter process by the use of a filter aid wherein a finely divided solid porous substance, such as diatomaceous earth, is mixed with a wax containing solution and extracted with the wax adhering hereto in the filter press. This simple statement should make it obvious that a differential in gravity in the process is immaterial and that it is practical also for extracting wax of any nature from any stock."

The nature of this process makes it particularly adaptable to the stocks manufactured by the authors. Considerable research and development has been carried on in the laboratory and some very good results were obtained. Before any semblance of commercially economic results were obtained however several mechanical problems had to be ironed out.

To begin with, we were aware that to produce the sub-zero pour tests we wanted, it would be necessary to chill the solution to at least —40 F. A 3-ton Baker ice machine was used to supply refrigeration. In order to maintain capacity at these low temperatures (Ammonia Liquor —50 F.) it was found necessary to install a small air compressor which was converted to act as an ammonia gas booster.

The chilling tank itself consisted of the tank proper, a ¼-inch plate with a dished bottom and no top. Insulation was attained by making a sheet metal jacket one foot in diameter larger than the tank, affording a 6-inch annular space which was filled with ground cork. Suitable drains and outlets were provided by welding nipples in the bottom and sides.

Provision for mixing the cell was made by installing a jet mixing box and hopper. Dry filter-cel was emptied into the hopper and the jet action supplied by a small pump mixed the solution and cell, sending it back to the tank. A stirring device was installed in the tank to keep the cell in suspension. The pump used was of the typical rotary type, gear driven by small motor.

Considerable thought was given the type of press to be used. After much consideration, one was selected which embodied all of the most desirable operating features. For example, in operation the opening of the press was not necessary for the dumping of the cake, this being accomplished by a continuous closed discharge arrangement. Again, by the construction of the press, it was assured that an even cake would be built upon the leaves.

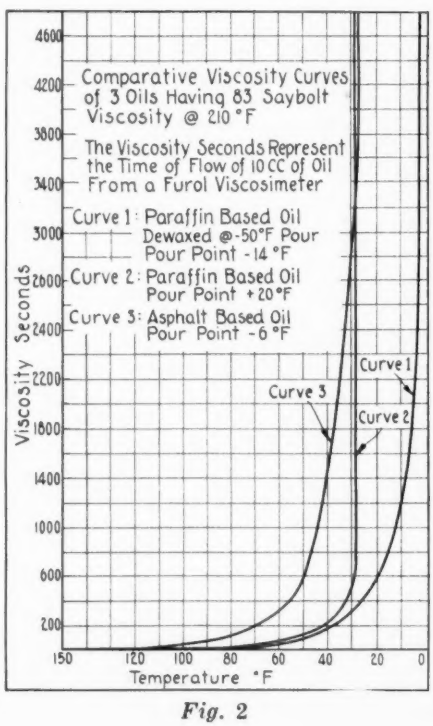

Fig. 2

A particularly desirable feature was the ease with which the whole system could be made vapor tight, thus reducing solvent loss by evaporation. Steaming of the cake for the removal of solvent is possible and consequently will reduce the solvent loss in the cake.

In the laboratory stage of this work, very encouraging results were obtained, pour points being secured from —18 F. to —28 F. on stocks ranging from 120 viscosity at 210 to 200 viscosity at 100 F. Such work was accomplished by using gallon samples and vacuum filtering through a wax leaf with a small laboratory vacuum pump.

When large scale experimental work was started, weaknesses in the system showed up at once. In spite of ample insulation the solution warmed up 20 F. between the tank and the filter press. The filter-cel settled out in the lines and pumps and refused to move.

Moisture from the atmosphere settled in the solution, froze in combination with the cell and very effectively plugged the lines. The agitator was running too fast, throwing the cell to the outside of the chilling tank, giving a small amount of cell at the start of the run and a large excess at the last of the run.

The first corrective step taken was to install the press in a specially constructed cold room 6 x 6 x 8 feet and refrigerated by another 3-ton Baker unit. With this arrangement, the press and cold room could be chilled down to —30 F. before the run was started. At the conclusion of the

first run with this new installation an initial temperature of —25 F. was noted.

Investigation proved that in circulating the solution through the press the heat equivalent of the work done on the solution by the pump was the cause of most of the temperature rise. Inspection of the connecting lines between the tank, pump and press disclosed many fittings which would produce additional turbulence tending to put the wax back into solution.

In addition to these difficulties, the cell by nature is extremely abrasive. It was found by trial that the pump, although a slow speed rotary type, wore out very quickly in pumping service. Another gear type pump was installed with not much better success, the amount of abrasion being almost prohibitive from an economic standpoint.

Another series of changes took place. The agitator in the tank was re-designed to give a minimum turbulence to keep the cell in suspension and reduce the centrifugal effect. The location of the press was altered so as to bring the press inlet connection not more than three feet from the tank outlet. In place of pumping the filter-cel bearing solution, a top was installed on the chilling tank and natural gas used to blow the solution to the press. The method of mixing the cell was changed so that no heating due to jet action was experienced.

At the conclusion of these and other minor changes in the whole installation several successful runs were made. Noted below is a typical report on one of these runs.

Low Temperature Dewaxing (Runs Nos. 35 and 36)

It had become evident in the previous runs with the special filter press that the cold oil was warmed up too much before it could reach the press on account of the long line connecting the press with the chilling tank. In order to get around this trouble, a small four-leaf filter was installed directly underneath the chilling tank. The filter drum has a jacket for cooling from the outside with ammonia. The leaves can be cleaned by unbolting the front plate of the drum.

One hundred sixty gallons of wax free oil from the Sharples plant were chilled to —42 F. Two runs were made: No. 36 with ½ pound of Hy-flo Super-Cel per gallon of stock and No. 36 with one pound.

The addition of one pound of filter aid per gallon of stock to a 25/75 solution of oil in naphtha as the one used in the present runs raised the temperature from —42 F. to about —36 F. The temperature of the oil in the chilling drum was —42 F. at the start. During run No. 35 the temperature in the chilling drum was —39 F., one-half pound of Hy-flo Super-Cel having been used; and during run No. 36 the tank was at —36 F.

In our estimation, considering the short connection between chilling drum and filter, and in spite of the high outlet temperatures, the temperature in the press was not more than 2 to 4 degrees F. higher than the temperature in the chilling drum. Based on this assumption, we arrive at filtering temperatures of about —36 F and —33 F. for runs No. 35 and No. 36 respectively. The average pour points are —10 for No. 35 and —6 for No. 36. The difference between filtering temperature and pour point comes to about 28 F. or even less. This result is as good as results obtained by vacuum filtration.

For comparison of vacuum and pressure filtration run No. 33 was made as a repetition and check of preliminary laboratory work using vacuum filtrations:

Eight gallons of a mixture of 40 per cent 70/75 viscosity at 210 F. sharplessed stock with a cold test of 5 F. and 60 per cent solution naphtha were chilled to —46 F. A single filter leaf was immersed and oil was filtered out by means of vacuum.

TABLE 3

Grade of Filter Aid and Rate of Filtration

RUN NUMBER	23	24	27	28	25	26
Filter Aid	Hyflo-Super Cel		Super-Cel		Filter-Cel	
Pounds per gallon of Stock	1/4	1/2	1/3	2/3	1/3	2/3
Rate of Filtration (gals per sq. ft. per hr.)	9.3	14	7.0	7.8	6.7	7.5
Av. Temp. (difference between filter and pour point F.)	30	30	30	30	30	30

TABLE 2

Tests on Reduced Filtrate Were as follows:

Sample	1	2
Gravity	24.4	24.6
Flash, F.	440	445
Fire, F.	505	520
Viscosity at 210 F.	84½	86
Pour, F.	—18	—16

While the experiments were going on it was suspected for a while that some of the smallest wax particles suspended in the oil ran through the filter cake and filter, causing a larger than necessary differential between filtering temperature and pour point, particularly under the somewhat uneven action of the pump. For this reason finer grades of filter aid were tried. As can be seen from Table 3 the suspicion was unfounded and only the rate of filtration was affected.

Weir Process vs. Centrifuging

While the rate of filtration is an important economical factor, it is, within certain limits, second to another variable introduced by the quantity of naphtha used for dilution. More naphtha means more power used per barrel of finished stock for chilling as well as distilling, to say nothing of increased losses of solvent. It is this factor that the advocators of the Weir proceess claim makes the filtering more economical than the centrifuging.

Comparing the Weir-filtration method with centrifuging or cold settling, they claim that naphtha required for dilution in the Weir process amounts to 45 per cent; for centrifuging 65 per cent; and for cold settling 75 per cent.

In our filtration experiments on semi-plant scale we found it necessary to use about the same amount of dilution naphtha as our commercial Sharpless plant is using. When it was tried to cut down the naphtha,

TABLE 1

Test on Wax Free Oil
Pour Point +20 deg. F.

Run No.	No. 35		No. 36	
Temperature of solution in drum	—39 deg. F.		—36 deg. F.	
Hy-flo super-cel per gal. of stock	½ lb.		1 lb.	
Filter rate, gal. per sq. ft. per hour	15		17.5	
Cake thickness	½ in.		1 in.	
Samples of Run No. 35				
Sample No.	**1**	**2**	**3**	**4**
Filter pressure, lb.	10	18	32	41
Outlet temperature, deg. F.	—25	—25	—25	—28
Pour point, deg. F.	—10	—10	—12	—12
A.P.I. gravity	24.6	24.6	24.8	24.2
Flash, deg. F.	435	435	440	445
Fire, deg. F.	495	505	495	510
Viscosity at 210 deg. F.	82	80	81	87
Samples of Run No. 36				
Sample No.	**1**	**2**	**3**	**4**
Outlet temperature, deg. F.	—24	—24	—24	—24
Filter pressure, lb.	12	21	40	49
Pour point, deg. F.	— 6	— 6	— 4	— 6
A.P.I. gravity	24.5	24.5	24.2	24.8
Flash, deg. F.	440	440	435	435
Fire, deg. F.	505	505	500	500
Viscosity at 210 deg. F.	84	84	84	83

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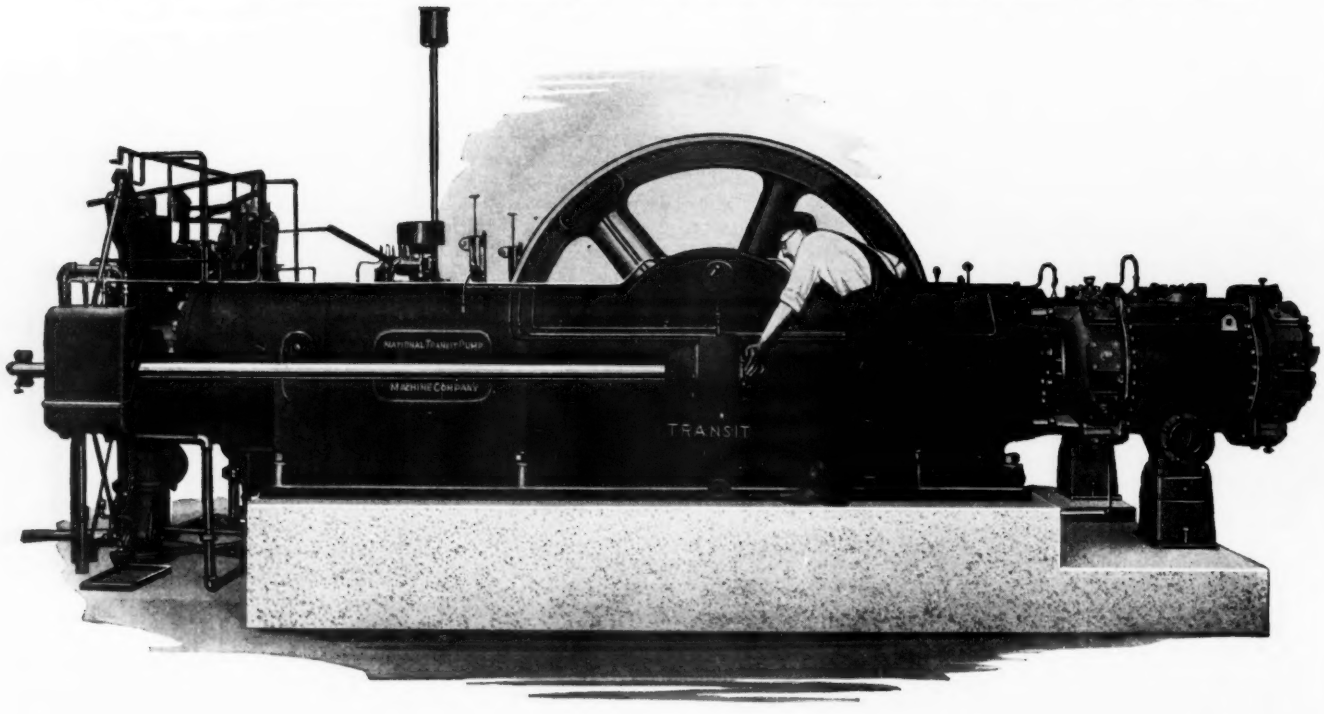

TABLE 4

Naphtha Content and Rate of Filtration

RUN NUMBER	32	30	39	40	34
Temp. in chilling drum F.	—40	—40	—40	—40	+30
Pounds of Hy-flo-Super-Cel	1/2	1/2	1	1	1
Grade of Oil	From Sharpless Plant		Treated Long Residuum		
Per cent Naphtha	75	66	75	66	50
Rate of Filtration (gals. per sq. ft. per hr.)	15	13	15	0.3	....

an abrupt drop in the rate of filtration was noted. This was the case with treated undewaxed long residuum. Partially dewaxed oils from the Sharpless plant naturally could be filtered successfully with much less naphtha. In Table No. 4 are some figures.

It will be noted that in order to filter successfully this long residuum at —40 F. it must be diluted with not less than 75 per cent naphtha. The Sharpless plant has been running at —25 F. on the same residuum, the same naphtha and the same and lesser degree of dilution.

As far as quantity of dilution naphtha is concerned, it seems to us, the two processes rate about equal. Naphtha losses will occur in either process no matter what type of filter or centrifuge is being used. True, in the Weir process the only loss of account occurs when the filter cake is being blown, and that can be reduced by employing steam or gas. The latter can be recirculated through an absorption system. But even such a process costs money, especially since the wet gas is likely to be rather lean as the blowing is done at very low temperatures; or in the case of steam time and energy is lost by heating and rechilling the filter.

One of the big troubles in centrifuging is that a high gravity naphtha must be used for good operation, to have a gravity differential as large as possible between the solution and the precipitated wax. This creates high naphtha losses. The Weir process does not depend on any gravity differential. Any naphtha within reasonable distillation range can be used. This not only reduces evaporation losses, but also does not tie up a large quantity of as high grade a naphtha, for which there is an ever increasing demand on the market.

As previously mentioned a temperature differential of 30 F. between filtering temperature and pour point was found consistently for treated long residues. In centrifuging the differential between feed temperature and pour point depends on various factors, but under favorable circumstances a differential of 30 F. or even better can be obtained. Figure 1 gives a comparison of the two methods in regard to working temperature and pour point of .80-90 viscosity at 210 treated long residuum.

The biggest advantage of the Weir process probably lies in its mechanical simplicity as compared with a centrifuge installation. There are no high speed moving parts which, if not carefully attended to, mean danger to life and property. There are few parts that need to be replaced regularly such as filter cloths, and these parts are cheap. Initial installation cost as well as wear of the Weir unit are relatively small.

From this short comparison of the two processes it seems that the Weir process is the better, except for one phase; the petrolatum recovery. The filter cake after being blown, must be extracted and the extract must be reduced in order to obtain the petrolatum, while petrolatum, as it is delivered by the centrifuges needs only a reducing operation to recover the naphtha.

Looking at the two processes from various angles one comes to the conclusion that it seems difficult to determine their superiority in regard to application on residual oils. This of course does not necessarily hold true where existing plant equipment or processes must be taken into consideration. While for one plant with its particular equipment and products the one process may prove advisable, for the next plant the other process may be superior. Some plants as a matter of fact have installed both processes to suit their needs for handling various stocks.

Solvents Other Than Naphtha

All of our work previously outlined has been carried on using the standard solvent naphtha as employed in Sharpless dewaxing. The employment of special solvents, such as alcohols, ketones, benzol and chlorinated petroleum ethers, have not as yet advanced to such a stage of development as to be in general use. With large scale employment of special solvents, the price should soon be within a range as to permit economical operation. Much work along these lines is being done by several companies, mostly on an experimental scale. The only commercial installations, within the writer's knowledge, employing other than naphtha as a solvent are in Illinois.

General Economical Conditions

Naturally the economic aspect of producing low pour test lubricant is of vital interest. Just where the happy medium is, between pour test on sub-zero cold test oils and manufacturing cost, is the subject of much conjecture with the refiners and marketers. From the consumers viewpoint, if the fluidity performance improved in proportion to the lowering of the pour point, (See figure 2 and also discussion in appendix) he can afford to pay a considerable premium for a special oil; this is more so the case in aviation because of the comparatively high maintenance cost and upkeep of aero engines.

Again the lowest desirable pour point is more or less governed by the extreme atmospheric temperature in which the product is to be used. A fair average for the United States in extreme cold weather conditions has been given as —20 F. An oil with a good fluidity at this temperature, provided it has the other necessary characteristics, should answer all theoretical requirements of an all-weather aero oil. With these qualifications obtained the problem of aero motor lubrication is now nearing its solution.

The inherent flow characteristics of the hydrocarbons present in any given lubricating stock govern, in the final analysis, the lowest temperature at which an oil will flow. Considering a set of samples of lubricating stocks from which all wax has been extracted, ranging from the least viscous, say 50 Saybolt seconds at 210 F., to the most viscous, having 200 Saybolt seconds at 210 F. The pour points of these samples plotted against viscosity will describe a straight line. The pour points in these cases are determined not by the presence of congealing waxes but are determined by the congealing at low temperatures of heavy cuts of lubricating stocks. Viscosity, then, is the ultimate limiting factor in the determination of minimum pour point, as is well illustrated by the following table and also by Fig. 3.

TABLE 5

Viscosity at 210 vs. pour points of oils made from straight paraffin base Stock and dewaxed at —40 F. by the Weir Process:

Vis. at 210 F.	Pour, F.
48	—18
60½	—12
96	— 8
118	+ 2
139	+ 6
160	+ 8
175	+14
201	+16

From refiner's viewpoint, many and varied complex factors affect the answer to the problem of the optimum low cold test. Second is the question of the use of an economical, efficient and easily recoverable solvent. By far the cheapest solvent in actual cost per gallon is a narrow cut, straight run naphtha, with about 200 F. initial and 400 F. end point.

Availability, ease of manufacture with standard equipment, and simplicity of recovery point to the use of naphthas as solvents. The flexibility, as far as initial, end point, gravity and distillation is concerned, puts naphtha at the head of the list.

Variations in these factors play a large part in the results of the actual dewaxing operation. According to a

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current article in the June issue of the *Refiner and Natural Gasoline Manufacturer*, in which two stage dewaxing, using the same solvent, is suggested, the use of any solvent other than naphtha is obviously excluded.

The final separation of solvent by distillation, comparatively easy using naphtha, becomes more difficult and may entail high losses when constant boiling liquids are used. Chlorinated petroleum products leave an undesirable trace of chlorine in the reduced stock even when used diluted with naphtha. Benzol plus acetone and butanol apparently the only other solvents employed on a large scale today, seem to be working economically.

Third, the lowest economical temperature to which a solution can be chilled, in the opinion of the authors, supplemented by the statements of several refrigerating equipment manufacturers, is —50 F. This temperature, unless future mechanical developments alter the statement, seems to limit definitely the pour test on any given stock. As noted in the forementioned test run, a constant temperature differential between solution and pour test of 30 F. was noted using naphtha as a solvent. This gives an economical cold test of —20 F.

These temperatures are only obtainable by the use of direct expansion, the use of brine being prohibited by the freezing point of the saturated solutions. Many valuable contributions to this problem of chilling have been made by refrigerating equipment manufacturers in the last two years.

The increasing use of direct expansion equipment such as continuous chillers, chilling towers and ribbon chillers, indicates that the minimum temperature requirements below zero will be met in the near future by direct ammonia chilling. Much development work has to be done yet in devising ways and means of better temperature control, especially with reference to chilling rate. Such refinements are bound to come in the near future through the combined efforts of the refiner and refrigerating engineer.

Demand plays a natural part in the economical production question. Until such times as the volume of consumption reaches a point where quantity production is in effect, the manufacture of these extremely low pour test oils can be done only either with a very narrow margin of profit or with no profit at all.

In 1926, no man would have predicted the phenomenal growth and development in aviation. In the face of the last three years' development, however, the logical conclusion can be reached, that in not more than three years from date, this economic phase of manufacture will be altered considerably for the better.

Educational advertising will play no small part in the expected increase in consumption. The uncanny power of this factor has been well demonstrated.

The major element in the cost of production of aero oils has been the power cost for refrigeration. Our figures show that this item stands at the head of the list. Consequently any developments tending to decrease the differential between chilling temperature and finished pour test will reflect very favorably on manufacturing cost.

The one logical angle to attack this problem seems to be through the solvent employed. As has been demonstrated to the industry, proper preparation of the stock, insuring a minimum of inhibitives present, the type of solvent used, plus the rate of chilling determine this differential. In the opinion of the writers, the answer is 90 per cent of the problem lies in the first two factors.

Lastly, complexity of process and high initial cost are two factors faced by every refiner dewaxing or considering such an installation; installation cost of equipment essential for such an installation is very high, operations are very minute and demand costly supervision and operators. With new and more efficient methods of wax extraction, this condition will, in all probability, adjust itself.

In closing, a glance at the latest development in aero motor power will give rise to room for conjecture from the refiner's viewpoint. Packard has taken the initial step and gone into quantity production in aero diesel engines. Working characteristics relating to working pressure, speed and temperature are entirely different and much more severe than in a gasoline engine. Whether this step will materially alter the existing lubricating oil specifications remains to be seen. However, we can rest assured that as the demands become more exacting in the future, they can be met as excellently as they have been in the past, secure in the knowledge that the oil business can supply any product the public is willing to pay for.

Appendix

Discussion of Fig. 2:

The three comparative temperature viscosity curves were obtained by allowing 10 c.c. of oil to flow from a Furol Viscosimeter filled completely, and measuring the time.

The authors fully realize that the curves do not represent a true picture of the performance of the oil in a cold motor. The only intention in making this figure, was to give a general idea as to what might be expected from a low cold test oil in regard to viscosity.

For more fundamental information on the subject we refer back to the works of Wilkin, Oak and Barnard,* Lederer and Staley'** and others.

*S.A.E. Journal February, 1928.
**Paper delivered at the S.A.E. meeting in Detroit, Jan., 1929.

Rectifying Plant Removes Hydrogen Sulfide from Cracked Gasoline

CHICAGO

A CRACKING plant that would continuously remove tar, gas, and gasoline as fast as produced, give a maximum yield of gasoline and no coke, with little gas, would be the ideal setup, according to A. L. Strout of the Standard Oil Co. of California. Since this does not seem practicable an approach to the ideal process is found by cycling, with removal of the gas, gasoline, and tar after each cycle.

In his discussion of "Some Developments in Commercial Cracking" before the American Petroleum Institute at Chicago, Mr. Strout stated that even this practice cannot yield a maximum of light products without the production of coke. The tar so removed from the system will contain intermediate fractions that will yield gasoline if carried to coke formation. Offsetting this in some measure is the formation of gas by further heating of the gasoline formed and remaining for some time in the system.

The basic principle in the control of coke formation in cracking is by limiting the amount of cracking taking place per pass. This control may be greatly aided by proper design of the furnace, and by controlling the velocity of the charging stock through the tubes, the author stated.

The author discussed the influence on gasoline and coke formation of liquid and vapor volumes, percentage of tar present in the liquid, and the relative time of exposure of vapor and tar to cracking conditions. In the digester the tendency to form tar may be reduced by lessening the size of the digester, or by increasing the pressure. According to curves shown agitation of the contents of the digester affects the results that may be obtained. Under conditions of thorough agitation, 60 per cent of the liquid is withdrawn before it has been retained one-half the average time; 36 per cent remains longer than the average time, while 13½ per cent remains more than twice the average time.

Regarding a commercial plant embodying the principles discussed, the author said:

This plant (Fig. 1) includes a furnace (A) of ample heating surface, in which the radiant heat is well distributed over a large number of tubes and in which high velocities are maintained. The evaporator (B) is of small cross-section, with provision for maintaining the liquid at a low level. This liquid has a commercial tar content of 35 per cent to 40 per cent, and is withdrawn to a flash still (D) at low pressure where it is distilled by its residual heat. The commercial tar, of about 200 seconds Saybolt at 130 F. is withdrawn from this still, and the vapors are condensed in heat exchanger (E).

The condensate from this exchanger passes to mixing chamber (F), to which the fresh feed is admitted. The mixed stocks from chamber (E) are pumped through the exchanger to this system. The vapors from the evaporator pass to a fractionating tower (C), from which naphtha is drawn overhead and cycle stock from

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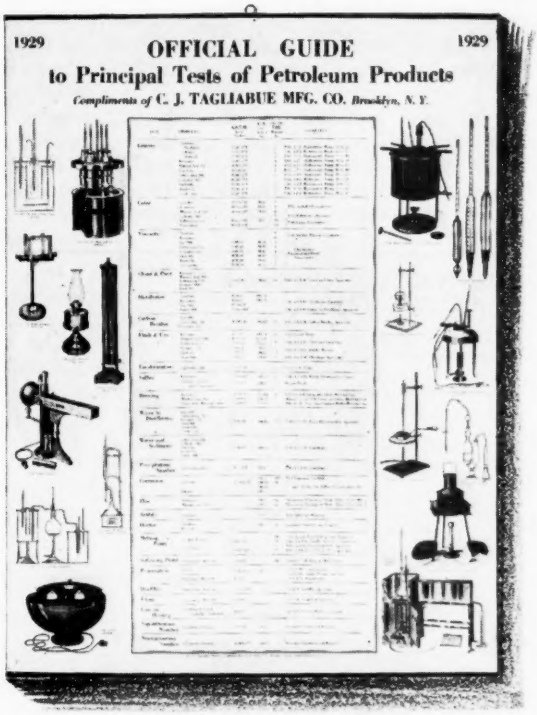

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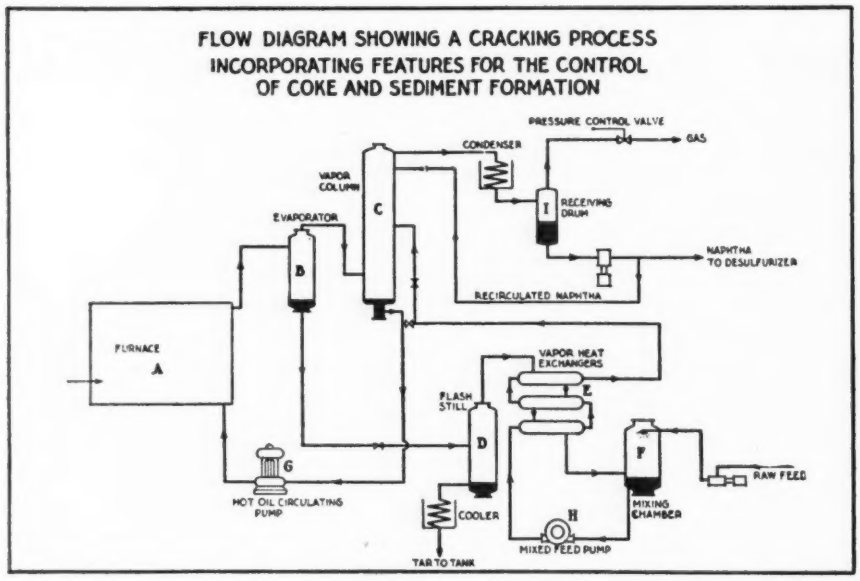

Fig. 1

the bottom. The cycle stock and fresh feed are pumped to the furnace (A).

A plant of this design will operate successfully on heavy gas oil or topped crude, with practically no formation of coke, and will produce a tar with a sediment approximately 0.3 per cent to 0.5 per cent. The yield from a plant of this kind will be contingent upon the degree to which the tar is reduced by distillation. The quality of tar withdrawn will be dictated, as a rule, by the viscosity required for blending and marketing purposes.

The author presented a diagram of a desulfurization and rectification plant for cracked naphtha which he stated had been quite successful in his refinery.

The diagram (Fig. 2) and his discussion of its operation are given in full below.

"In most cracking plants, the naphtha is condensed in the presence of the gases produced in the process. Naphtha and gas are, therefore, in equilibrium. The naphtha is saturated with fixed gases, including hydrogen sulfide, and the gas with gasoline fractions, the saturation depending on the pressure and temperature under which the two products are separated.

"It was found that a substantial amount of the fixed gases could be eliminated with a relatively small loss of gasoline, if separation could be effected at pressures in excess of about 150 pounds per square inch. Separation in two steps, for instance, the first at 250 pounds, the second at 150 pounds, involves lower losses of gasoline than separation in a simple step at the lower pressure.

"The naphtha withdrawn at the lower pressure is still a very 'wild' product. If released to atmospheric pressure, a considerable amount of rich gas is given off, which must be treated in a compression or absorption plant for the recovery of the gasoline fractions. With gases high in hydrogen sulfide, it is practically necessary to subject them first to a preliminary treatment for removal of the constituent. Both the naphtha and recovered gasoline still contain appreciable amounts of undesirable fractions and should, therefore, be subjected to a final rectifying step to complete the process.

"A more economical solution to the problem was finally developed, involving high pressure rectification of the naphtha before the final release of pressure. A very sharp fractionation is thereby obtained between desirable and undesirable constituents.

"The gas is practically free of gasoline fractions; the naphtha can be processed to any desirable vapor pressure, and is substantially free of hydrogen sulfide and other fixed gases—an important advantage in the subsequent treating and rerunning operations.

"The arrangement of the equipment is illustrated in Fig. 2.

"The first step in the process begins with the separation of the gas and liquid in the pressure stills receivers. This separation of the gas from the naphtha aids in the fractional separation that takes place in the secondary receiver (A), which is held at a gage pressure of 140 pounds to 160 pounds. The gas discharged at this point is relatively dry, and the loss of gasoline fractions small.

"The separated naphtha is picked up at this point by a pump shown at (B), and discharged through a heat exchanger (C) into a bubble-plate tower (D) under a pressure of about 300 pounds. The stock in the bottom of the tower is maintained at about 460 F. by circulation through a furnace (E) by means of a pump.

"The rectified naphtha passes from the bottom of the tower through the heat exchanger and a cooler (G). Reflux is produced by water cooling, and is pumped to the top of the tower which is held at about 110 F. The exact temperatures will, of course, depend upon the vapor pressure of the naphtha and the degree of stripping desired.

"The receiver (A) is of quite large capacity, and so acts as a surge chamber in which minor fluctuations in the rate of naphtha production are absorbed. The discharge of a relatively large volume of gas at this point relieves the demand on the tower, and makes it possible to operate at moderate pressures while using an ordinary water supply for reflux condensing.

"The principles involved in this process will be readily understood. This process is practical, and has been entirely successful in operation. The rectified naphtha is practically free from hydrogen sulfide which is discharged with the gases, and the caustic required for pre-treatment has been reduced to a minimum."

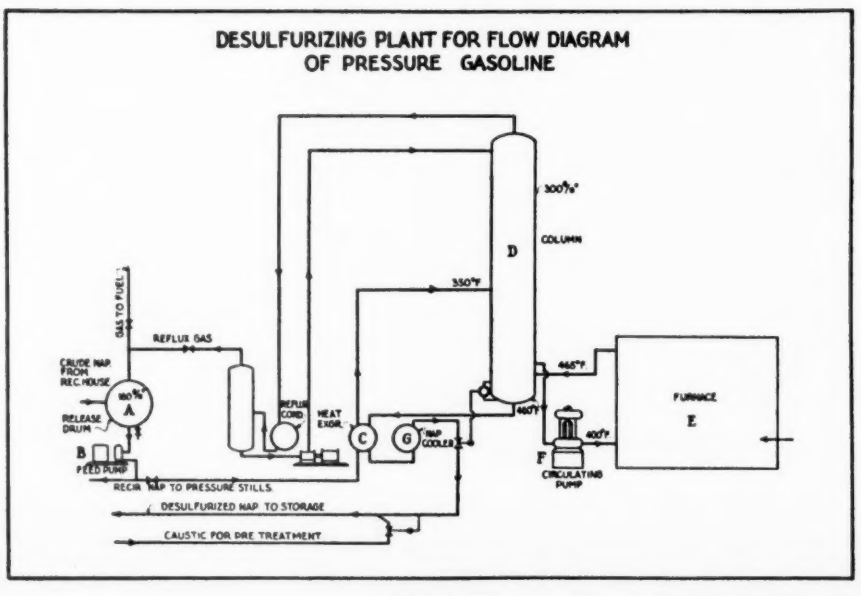

Fig. 2

Free Sulfur Is Greatest Corrosive Agent in Cracking Plants

CHICAGO

SO FAR as corrosion in pressure stills is concerned sulfur compounds will react in a general way in the proportion that they yield free sulfur, under the conditions of heat and pressure existing in cracking equipment. According to exhaustive tests reported by E. Retailliau and F. R. Lang of the Shell Petroleum Corporation in a paper on "Cause of Corrosion in Cracking Plants" presented before the American Petroleum Institute, the corrosive action of other substances tested was relatively very small in comparison with that shown by free sulfur, hydrogen sulfide, and other sulfur compounds which decompose under the temperature of the cracking still to liberate sulfur.

These investigators conducted laboratory tests on the corrosion effects of various chemicals and sulfur compounds on steel and wrought iron, by heating these metals to approximately 900 F. in a pyrex tube in an atmosphere of the vapors of volatile sulfur-containing compounds, and also in the presence of free sulfur. Air was in all cases excluded from the tubes during heating and cooling, to eliminate any action by atmospheric oxygen.

Strips of the metals were placed in the tube, the tubes evacuated and heated to about 900 F., and held at that temperature for 24 hours while a concentration of the material being tested was kept in contact with the strips. The tube was closed during cooling, and was opened at room temperature.

The authors report that, when testing the action of pure hydrogen sulfide, free sulfur in considerable quantities was found in the tube at the termination of the experiment and the corrosion was heavy. This free sulfur resulted from the dissociation of the sulfide at the temperature employed, hydrogen sulfide decomposing very readily at elevated temperatures.

Free sulfur showed the greatest corrosion of all the agents studied, as determined by the loss of weight by the test strips. This loss was several times that sustained when even hydrogen sulfide was used. Appreciable action was shown by n-butyl disulfide and ethyl disulfide and both hydrated and anhydrous magnesium chloride gave slight corrosive effect. No appreciable action whatever was observed when using sodium chloride, or naphthenic acids derived from California crude.

Table I gives the per cent of weight loss of the test strips employed, and presents an idea of the comparative action of the various reagents.

The authors explain the corrosion in still tubes by the theory that sulfur compounds are decomposed in the tube where temperature conditions are suitable, and have found that the point of greatest action is not the hottest point in the still but where the oil has reached a temperature high enough to decompose sulfur compounds. Corrosion in reaction chambers, vapor lines, and reflux lines is probably due to these decomposition products, they believe, with possibly a small amount of water which may be carried all through the system.

As a result of their work the authors conclude that:

"1. In cracking plants using a sulfur-bearing charging stock, it seems that corrosion is mainly due to the action of elementary sulfur during the period of cracking, with an additional corrosion by hydrogen sulfide and sulfur dioxide taking place during the steaming period when the plant is being shut down.

"2. The mechanism of corrosion seems to be the decomposition of organic sulfur compounds, liberating hydrogen sulfide, which in turn is decomposed at the temperatures employed, into hydrogen and elementary sulfur. The elementary sulfur then attacks the steel."

TABLE I

Corrosion of Iron and Steel by Various Chemicals at 900 Deg. F.

Chemical	Resulting Corrosion in Per Cent Loss by Weight — Non-Polished		Polished	
	Wrought Iron Per Cent	Steel Per Cent	Wrought Iron Per Cent	Steel Per Cent
H_2S	0.9	1.1	2.0	2.3
SO_2	0.1	Trace	1.2	4.4
HCl	*	*	0.24	1.0
S	5.5	4.5	6.5	10.7
Naphthenic acids	*	*	*	*
n-Butyl-disulfide	Trace	Trace	1.8	0.6
Ethyl disulfide	Trace	0.5	0.2	0.8
NaCl	*	*	*	*
$MgCl_2$, $6H_2O$	0.1	0.2	0.2	0.4
Mg_2OCl_2	*	*	*	*
$MgCl_2$	0.2	0.3	Trace	0.2

*Indicates no scale.

TABLE II

Analysis of Scale from Cracking Units

Constituent	Dephlegmator No. 8 Bottom Plates Per Cent	Dephlegmator No. 16 2d Plate from Bottom Per Cent	Dephlegmator No. 16 4th Plate from Bottom Per Cent
S	24.4	15.3	12.1
Cl	0.4	0.7	1.0
Fe	42.8	26.9	20.8
Mg, Na (by difference)	0.3	0.6	0.9
Insoluble in water	32.1	47.8	48.0
Volatile matter and moist	0.0	8.7	17.2
	100.0	100.0	100.0
Approximate Constitution of Scale			
FeS	66.9	42.1	32.4
Fe_2O_3	0.3	0.1	0.5
$NaCl$-$MgCl_2$	0.7	1.3	1.9
Volatile and insoluble	32.1	56.5	65.2

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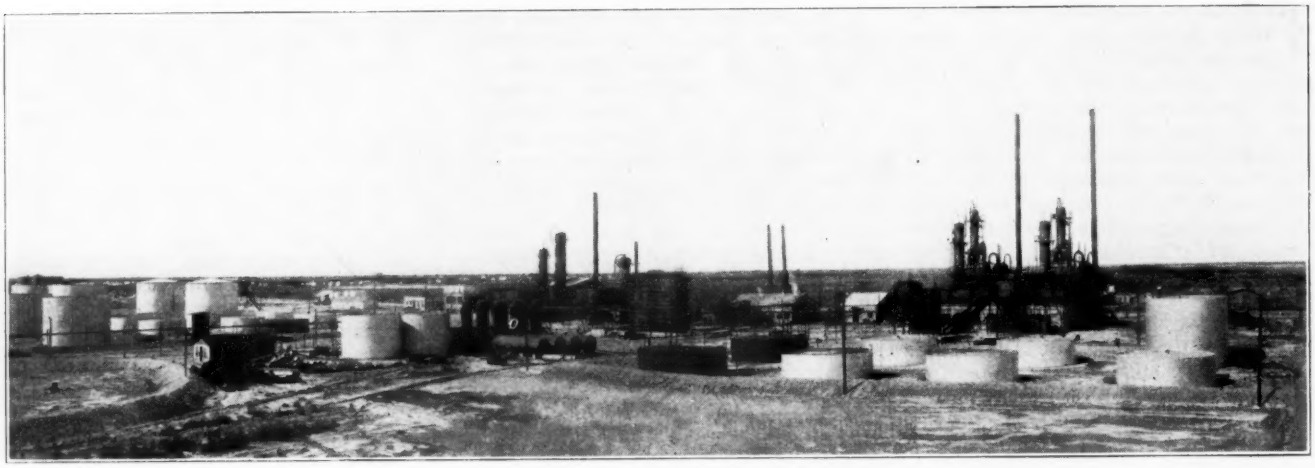

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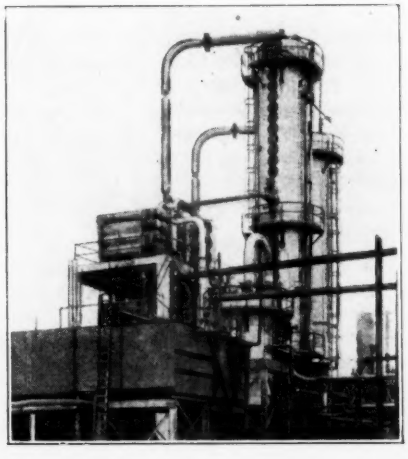

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Products of Vapor Phase Cracking Result of Secondary Reaction

CHICAGO

THE formation of fixed gases, and of fuel oil, during the cracking of petroleum hydrocarbons in the modern cracking still, is probably the result of secondary, rather than primary, reactions. If this were not the case wide differences in the quality of the gas made from a variety of charging stocks might be expected which differences have not been found. It has also been fairly well proven that an increase in the temperature or the time of reaction in cracking operations will increase the ratio of fixed gas to motor fuel produced.

These and other related conclusions were expressed in a paper on "Principles of Vapor Phase Cracking," presented by R. C. Osterstrom and C. R. Wagner of the Pure Oil Co., before the American Petroleum Institute. Regarding the formation of gas the authors said, "Complete data on this point have not yet been collected, but * * * analyses from a widely different charging stocks * * * indicate the similarity in origin of the gases produced.

"Partial analyses have also been made on gases from Spindletop, Sweet Lake, Smackover and Mexican crudes. Except for variations in carbon dioxide and hydrogen sulfide they were very nearly identical so far as figures were obtained.

"These data all indicate that it is highly improbable that we have in the final products under these operating conditions any large quantities of material which represent entirely the products of primary reactions in the disintegration of the gas oil molecule. It was thought interesting, therefore, to make some rough calculations as to the time occupied by any given particle of gas oil in passing through the converter.

"By means of exploring thermo-couples and sample cock connections temperatures and analyses of vapors were obtained at the end of each pass in the converter. Using Boyle's Law, and assuming molecular weights for the various fractions, it was possible to calculate velocities and from these estimate roughly the time of exposure to heat. It is appreciated that such methods can lead at best to approximations, but they should not be more than 25 to 50 per cent in error.

"By these methods we found that it required from 0.8 to 1.5 seconds for vapors to pass through the converter, depending on the length of the tube and the temperature employed. Of this time 0.10 to 0.20 second was required in getting the vapor up to the cracking temperature, and during this preheating period practically no cracking occurred as measured by gas and gasoline production.

"It is evident then, that any attempt to determine the course of the cracking reaction at these temperatures by experimental means must provide for the separation of samples after a contact time of much less than a second."

Data from experimental runs on a vapor phase cracking unit were presented, which indicate that the average boiling point of distillates rerun under similar conditions to a 430 end point decreases as the cracking temperature increases, which is accompanied by an increase in the iodine number of the distillate.

To investigate the effect of time of contact on the formation of gas during vapor phase cracking, the authors used 426 end point distillate as charging stock in the experimental setup, without recycling. "About ten per cent of the polymerized fractions accumulating in the (bottom of the) tower consisted of heavy fuel exactly similar to the fuel produced in the regular way when cracking gas oil," it was stated. The remainder of these "bottoms" resembled recycle fractions produced during normal operation.

The authors stated that work on an experimental vapor phase cracking unit, the results of which may be interpreted in terms of plant operation is in progress and that they hope when this unit is available to be able to obtain data on the primary reactions occurring at the temperatures employed.

Although unable to present within the limits of a paper all the data to support their conclusions, the authors have fairly well proven that:

Up to two atmospheres pressure, the only effect of pressure upon the cracking reaction in the vapor phase is to increase the time factor.

Changing the time, or the temperature between 1050 and 1150 Fahrenheit has little effect upon the quality of the distillate unless the time is so short as to give a recirculation ratio in excess of six to one.

Low vapor velocities in

The Art of Fractionation

THE fractionation of liquids, commonly called rectification, harks back to the towers of the 15th century, according to the third article written by Col. George A. Burrell, and appearing next week in the NATIONAL PETROLEUM NEWS.

The first near approach to the results obtained by the modern fractionating column was probably in the Coffey still about 1831. Plates for bubbling vapors through liquid, overflow pipes, and reflux were used in this still much as they are used today.

Col. Burrell discusses the work of several investigators on the theoretical phase of column calculations, and the application of the principles involved to the separation of atmospheric gases and the hydrocarbons in natural gas. Col. Burrell states that "High pressure columns are used more in the natural gasoline industry by those familiar with rectification principles than low pressure ones."

" . . . Modern laboratory apparatus for fractionating natural gas consists of a column using Henning's scheme of holding a uniform low temperature, but applying it to regulated reflux at the top of the column . . . "

The work of such men as Leslie, Podbielniack and others with the Phillips Petroleum Co., and of Shepherd, Frey and Yant is referred to by Col. Burrell as very important in developing the principles of rectification and applying them to natural gasoline manufacture.

(Article 3 of this series will appear next week in NATIONAL PETROLEUM NEWS.)

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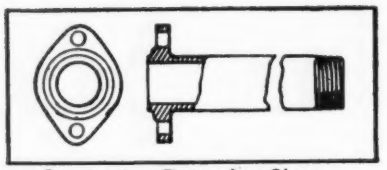

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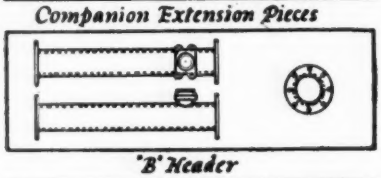

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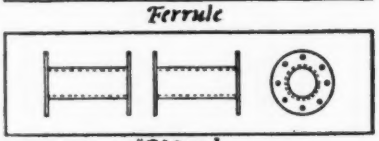
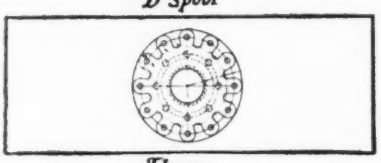
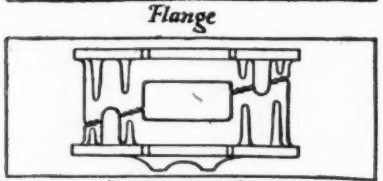
Ferrule



"D" Spool



Flange



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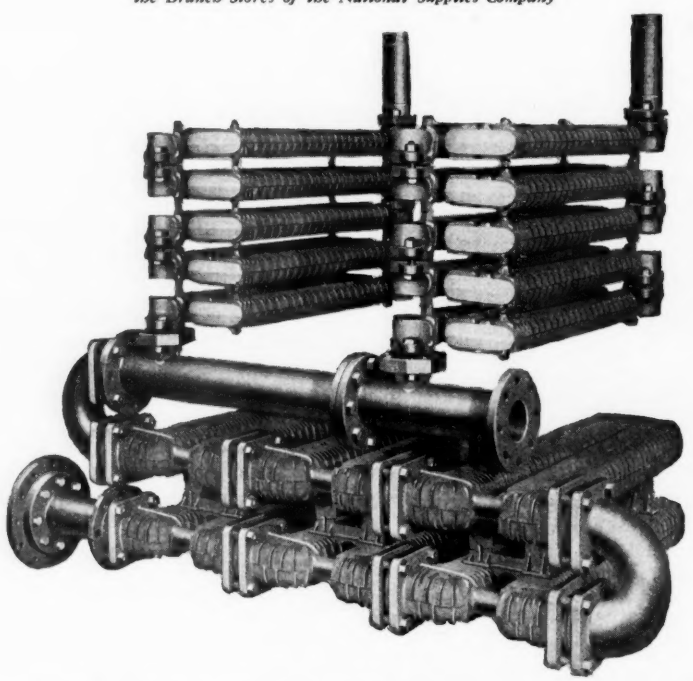

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zones of high heat transfer result in high gas to motor fuel ratios.

The vapor phase cracking reaction is strongly endothermic, and therefore, requires the addition of large amounts of heat to maintain the cracking temperature constant.

Variation in the quality of the charging stock causes some variation in the quality of the motor fuel produced, but this effect is much less pronounced at vapor phase cracking temperatures than at the lower temperatures employed in liquid phase cracking.

It is also stated by the authors that further research is being carried on to determine what effect the properties of the charging stock has on the treating required to manufacture a finished stable product.

Metals, Sunlight and Moisture Affect Gum Formation

CHICAGO

THAT results of gum determinations on gasoline by the copper dish, steam oven, and oxygen absorption methods, as now practiced, cannot be correlated with each other or with the performance of the gasoline in storage, is the conclusion expressed by E. C. Herthel and F. A. Apgar, of the Sinclair Refining Co., in a paper to be presented before the refinery technology section of the American Petroleum Institute at Chicago Dec. 5.

Results of comparative tests on both liquid and vapor phase gasolines presented by the authors show that the nature of the metal in contact with the gasoline during test affects very markedly the amount of gum found. Copper has a greater effect on gum formation than does steel, which probably accounts for the high results obtained in the copper dish test.

The authors stated that, on one sample of gasoline refined by one method, the copper dish test showed 1054 milligrams of gum and the oxygen absorption method gave only 128 milligrams. The same gasoline prepared in another manner showed 1001 milligrams by the copper dish, and only 4 milligrams by the oxygen absorption test. The unrefined naphtha gave 1000 milligrams by copper dish and 1600 milligrams of gum by oxygen absorption.

Four weeks' exposure in glass containers was sufficient to bring the gum content of all samples to a relatively equal basis, regardless of the initial gum tests or of the character of the original stock, the authors stated. Contrary to expectations, storage tests in the dark showed that the copper dish test is more indicative of steam oven gum formation than the oxygen method.

Storing cracked gasoline in a 15,000-barrel vented tank for six months increased the copper dish and steam oven gum formation, while the oxygen

(*Continued on Page* 95)

Presence of Gum in Gasoline Not Indicated by Color

CHICAGO

THE color of a gasoline has no relation to the quantity of gum it contains, according to a paper on factors affecting the determination of gum in gasoline presented before the American Petroleum Institute meeting at Chicago, Dec. 5, by C. R. Wagner, assistant chief chemist, and Julius Hyman, research chemist, of the Pure Oil Co.

Decidedly yellow gasoline frequently shows very little gum, while water white samples may deposit large quantities, it was brought out.

The analytical determination of gum formation in gasolines has been a matter of controversy for years, and a reliable, practicable test method is much to be desired, the authors reported. Gum formed by the evaporation of a sample of gasoline is a sticky, viscous, sometimes solid substance, varying in color from yellow to reddish-brown, with an odor resembling that of varnish. Gum, after formation, is only slightly soluble in gasoline, the best solvents being benzene, ethers, alcohols, and the lower organic acids.

The "gum" which deposits from gasoline on long standing apparently is not the same material that is formed on evaporation. Gasoline contains very little gum as such, the presence of substances which may be called "pseudo-gums" being responsible for gum formation. The authors employed a modification of the Smith and Cooke steam-oven method[1] for gum determination, using a boiling water bath in lieu of the steam oven.

(1) Bur. of Mines Rept. of Investigation No. 2394 (1922); No. 2586, (1925).

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water bath in lieu of the steam oven.

Test data show the copper dish method to be unreliable in comparison with the steam oven method or the modification used by the authors. The ratio between the quantity of gum formed in the steam oven and the water bath methods appears to be fairly constant regardless of the amount of residual gum present in the sample.

Ultimate analyses indicate a general similarity of gum composition from whatever the source, the empirical formula being approximately $(C_6H_8O)_x$. Acid numbers and saponification values indicate either an ester or a lactone structure.

Evaporation of a water extract of gasoline leaves a brown gum with a caramel-like odor. This and other data obtained by the authors and other investigators indicate the presence of aldehydes; croton-aldehyde dissolved in straight-run gasoline produces on evaporation a gum similar to that from old cracked gasoline. Alcoholic potash added to gasoline high in pseudo-gum forms a red-brown resin, with almost explosive violence.

The action of oxygen on pseudo-gum free gasoline is sometimes explained by supposing the presence of an anti-catalyst. Auto-catalysis would seem to be a more likely explanation. Gasoline under 310 pounds oxygen pressure in a bomb held in boiling water absorbed oxygen rapidly and gave a strong odor of acrolein. Hydrochloric acid, chlorine gas, nickel and cobalt acetates, and anhydrous calcium chloride were very active in promoting oxidation in gasoline, while glacial acetic, alpha-crotonic acids, and hydrated calcium chloride showed little or no action as compared with those first mentioned.

The data appears to indicate peracids as the auto-catalysts; if so, the reaction must be different from that of the Prilezhaev reagents, in that the former produces an increase of catalyst, the latter a decrease. Oxidation of the olefinic bond may produce a peroxide. Further oxidation of this compound probably forms the catalytic per-acid through the intermediate aldehyde.

Pseudo-gum is believed by the authors to be in the form of complex oxygenated or polymerized compounds and their degradation products. Such compounds in non-aqueous solution would tend to form glycol esters which then polymerize to form furan derivative gums, etc.

If this theory is correct, the behavior of evaporated gasoline is at once explicable. The stability of the intermediate products is the factor which controls the rate of pseudo-gum formation. The amount of pseudo-gum formed would be some multiple of that originally present. Of greater importance to the refiner is the rate of pseudo-gum increase during storage.

Gum Formation

(*Continued from Page 93*)

absorption gum was appreciably decreased, the color being only slightly changed, they reported. After exposing a sample of this stored gasoline for 27 hours to good sunlight the oxygen test showed the greatest gum increase, and the color dropped to 0. This sun-exposed sample showed gumming when used in an automobile engine, whereas the stored but unexposed sample deposited no gum when similarly used.

The authors discussed an apparatus and method which they employed for further study of the oxygen absorption method, which they considered theoretically to be the most logical one to correlate with potential gum. Both dry and wet oxygen gas were used, and the runs were made at atmospheric pressure to avoid troubles likely to arise with either vacuum or pressure systems. It was found that, with rubber stoppers used to seal the absorption bulb, all samples showed the tendency to absorb oxygen at about the same rate. The use of cork stoppers made gas-tight with water glass eliminated this effect, and changed radically the characteristics of the absorption curves.

The conclusions drawn from the results of the investigation are that:

1. The use of equipment which is entirely inert to possible physical and chemical effects is important.

2. Presence of moisture accelerates oxidation and dry oxygen or oxygen of controlled moisture content is essential for uniform results.

Further work along these lines is contemplated by the authors.

CHICAGO, Dec. 5.—Prediction that the oil industry will abandon trial and error methods in chemistry for research based on theoretical predictions made with an accurate knowledge of properties of substances dealt with, is made in a paper presented before the American Petroleum Institute by A. W. Francis and R. V. Kleinschmidt of Arthur D. Little, Inc., Cambridge, Mass.

The authors discuss possibilities of thermodynamic methods in predicting reactions. While a vast amount of work needs to be done in assembling preliminary data, the authors assert that results are sure in the development of cracking processes and catalytic synthesis.

NEW YORK, Dec. 6.—Union Tank Car Co. has ordered 1000 tank cars from the American Car & Foundry Co.

Give Lube Oils a Final Clarification

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LUBE oil refineries will find that it pays to give their lubrication oil a final clarification before loading for shipment to customers.

The cost of so doing is small and is fully justified as an assurance for selling clean products.

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"What About The OILGRAM?"

—asked the executive of a gasoline company on the west coast recently of a Tulsa oil man. His answer was . . .

"If you were to wire me for Mid-Continent gasoline prices today, I would phone a member of the OILGRAM staff, and my reply to you would be the *gist of what he told me.* The OILGRAM staff is in direct and close contact with the markets almost every hour of the business day. *They know their business.*"

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Molecular Weight Data Aids Designers

CHICAGO

KNOWLEDGE of the molecular weights, or at least the average molecular weights, of the various cuts of crude petroleum aid the designer of refinery equipment in much of his important calculation. When such data is available the correlation of the more easily obtainable information, such as A.S.T.M. distillations, specific gravity, and viscosity with it places the designer's calculations on a much more certain basis.

Determinations of the average molecular weights of the fractions of a representative Mid-Continent Crude were presented before the American Petroleum Institute at Chicago on Dec. 5, by Ogden Fitzsimons and W. H. Bahlke of the Standard Oil Co. of Indiana. The fractions were obtained by distilling the crude in a special apparatus, using a packed Hempel Column with carefully controlled tower temperature, and dividing the distillate into two and one-half per cent cuts.

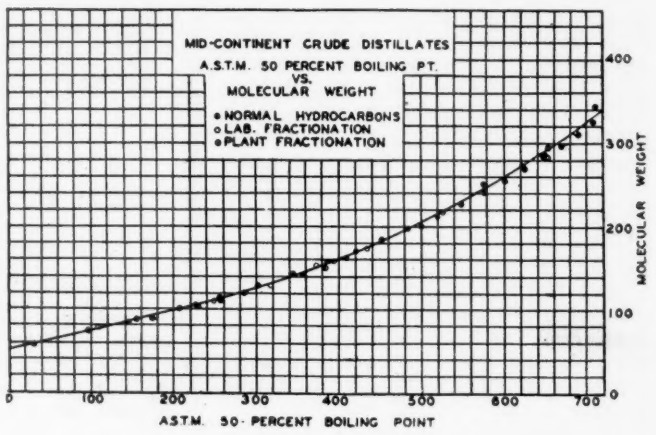
The heavier fractions were distilled at five millimeters absolute pressure, the lighter ones at atmospheric pressure. The wax-bearing cuts were dewaxed at —15 F. in naphtha solution with subsequent naphtha removal before the determinations were made on them.

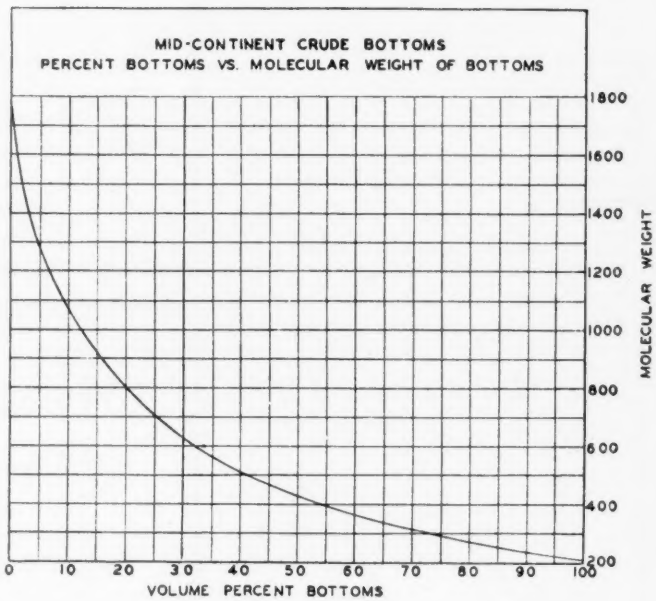
Most of the determinations were made by the cryoscopic or freezing-point method, with some cross checks using Victor Meyer's vapor density and the Menzies-Wright boiling point rise methods, the authors stated. Determinations were made with varying concentrations of solute, and with different degrees of super-cooling.

The authors showed curves giving the relationship between molecular weights and: the 50 per cent boiling points of fractions; per cent bottoms; pound mols per 100 pounds crude; volume per cent distilled off to molecular weight of total distillate; Saybolt viscosity; absolute viscosity; total volume per cent of distillate and of bottoms.

The authors stated that, while other combinations could be shown which might be serviceable in some cases the curves which were presented contained sufficient data for the construction of other curves that might be needed by others desiring such plots.

The two curves here shown give the relationships between molecular weights and the 50 per cent boiling points of the distillate fractions; the molecular weights and the per cent bottoms respectively.





S. O. Indiana Announces Manager Changes

CHICAGO, Dec. 6.—President E. G. Seubert has announced the following promotions and transfers of managers of the Standard Oil Co. of Indiana, effective on Dec. 2.

N. R. Grimshaw, assistant general manager at large and in charge of Chicago division will relinquish the latter responsibility to give more time to his other duties.

H. A. Lewis, formerly assistant general manager of the eastern division, will assume position of assistant general manager in charge of Chicago division and general sales.

R. F. McConnell, formerly company manager at Detroit will succeed Mr. Lewis as assistant general manager of the eastern division.

P. A. Raupagh, formerly company manager at Milwaukee will be manager at Detroit.

J. H. Budde, formerly company manager at Decatur, Ill., will be manager at Milwaukee.

R. A. Miller, formerly company manager at Quincy, Ill., will be manager at Decatur, Ill.

E. N. Shallenberger, formerly assistant manager at Milwaukee will be manager at Quincy, Ill.

P. A. Serrin, formerly assistant manager at Joliet, Ill., will be assistant manager at Milwaukee.

H. A. Damkroger, formerly sales promoter at La Crosse, Wisc., will be assistant manager at Joliet, Ill.

CHICAGO, Dec. 5.—The Universal Oil Products Co. has recently brought suit charging infringement against Cosden & Co., the Globe Oil & Refining Co., LaSalle Petroleum Co., Orient Petroleum Co. of Delaware, South Texas Gas Co. and United Gas Co. and White Eagle Oil & Refining Co.

The suits were filed in the U. S. District Court, Delaware district. The patent alleged to be infringed is No. 1,281,884 applied for July 19, 1915 by Milton J. Trumble, assigned by him to the Shell Petroleum Co. and by the latter assigned, in 1925, to the Universal Oil Products Co. Claims 1, 2, 3, and 4 of this patent are claimed to be infringed.

This is the same Trumble patent on which final decision was rendered against the Skelly Oil Co. and in favor of Universal Oil Products Co. The infringement action was brought by Universal against Skelly in connection with the operation by the latter of the Jenkins cracking process.

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GASOLINE will REPEAT!

OIL COMPANY

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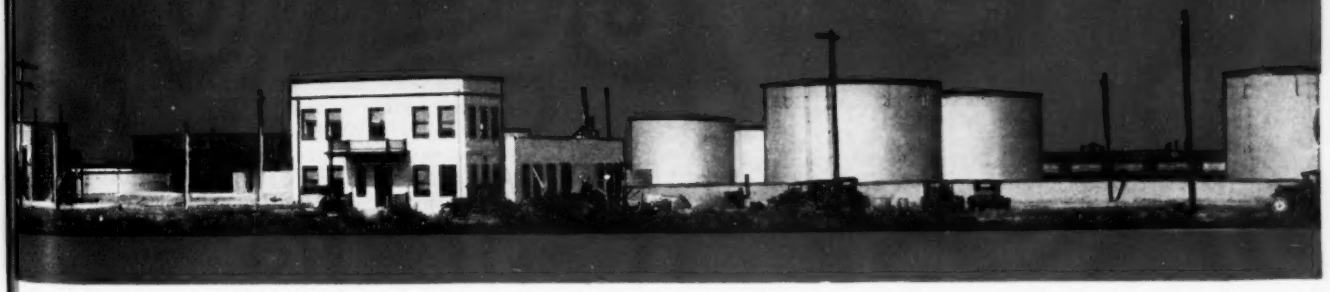


What the Well Dressed Service Station Salesman Is Wearing

By N. M. Mainpa
N. P. N. STAFF WRITER

UNIFORMS for service station attendants—what station operators' experiences with them have been, what types, materials and colors have been found most satisfactory and serviceable, what they cost, and what their upkeep amounts to, are some of the things told here by representative oil marketing companies operating service stations in various parts of the country.

Some companies have experimented with many different types of uniforms and many different colors to find the one best suited from the standpoint of appearance, serviceability, and the satisfaction of their own men in wearing them.

The uniforms are made mostly of heavy cotton materials, the canvass reveals, white duck being used more than any other material. Regular coverall material is also used extensively. Twill, herringbone, cotton whipcord, shrunk denim, and heavy serge are other goods used that have been found to stand the wear, tear and depreciation of service station work. Most companies using these materials say that they launder fairly easily.

Some companies use different types of materials for summer and winter uniforms, such as a light cotton cloth for summer uniforms, and flannel, corduroy and wool for winter.

Colors for uniforms are chosen for one of three reasons: either because they are the most attractive colors, because they carry out the company color scheme, or because they are serviceable and do not show dirt very readily.

Two or three companies found that a color they had picked faded with frequent washing, and had to abandon that color. Some companies dry clean the uniforms instead of laundering them, to prevent fading or a washed-out appearance.

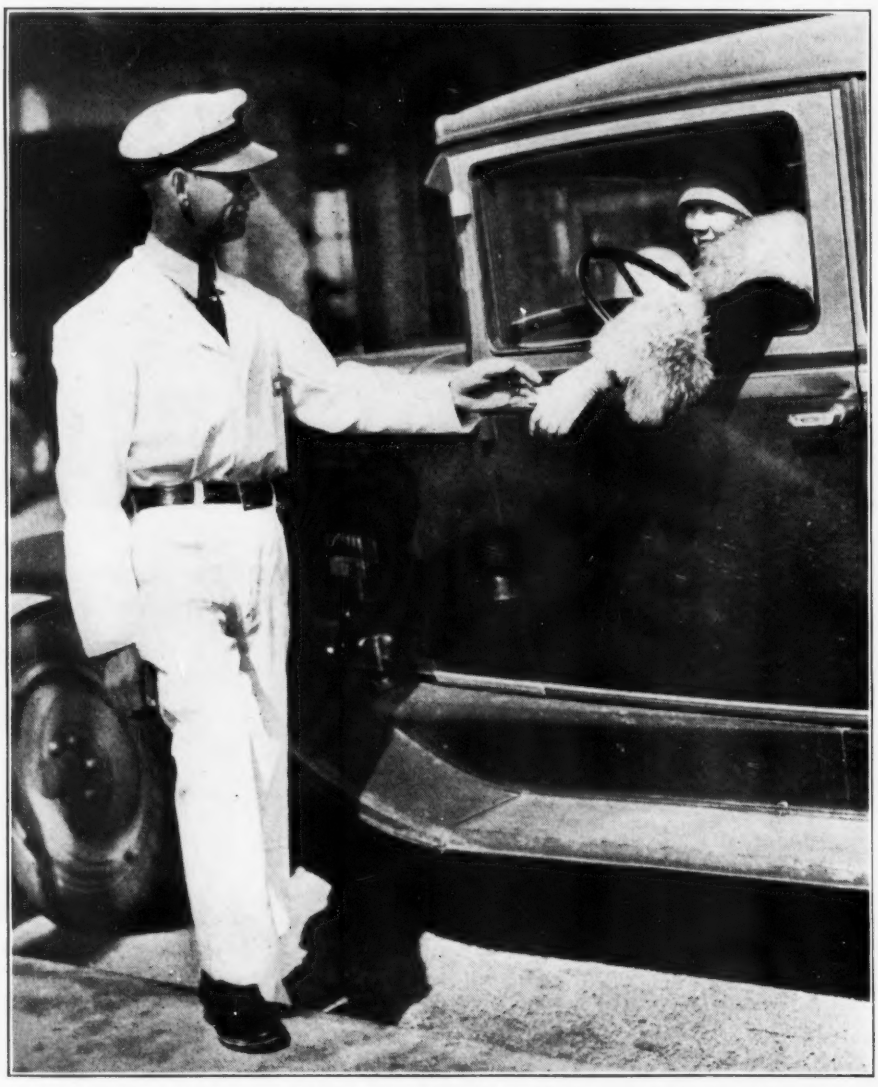
White seems to have preference for attendants' uniforms, with a blue and white combination running a close second. All companies using an all-white uniform agree on the reason for their choice—that the uniform looks clean, attractive and neat, and most of them said that white is generally easier to wash and does not fade as colors do.

Two companies' opinions differ on the laundering problem of an all white uniform. One says that it found white could not be dry cleaned well without the use of acid which ate into the material. The other one claims that white, with frequent washing, became discolored.

Cost of uniforms ranges anywhere from $2 for plain white duck trousers, up to $20 and $25 for complete outfits, which include breeches, coat, shirt, cap and leather puttees. A half-way price between these two extreme figures is paid by one company for a gray cotton whipcord uniform, consisting of breeches, blouse, cap, shirt and puttees. The cost of that outfit is $10 for one, and $16 for two.

Once a week seems to be the rule for laundering uniforms by the majority of companies for various kinds of materials and various colors. Eleven companies wash or dry clean them once a week; four companies, twice a week; three, every two days; and two companies, using a part white uniform, launder that part every day.

Two companies using an all white outfit have them washed twice a week,



All white coveralls are used by the Standard Oil Co. of Ohio for attendants at two of its super service stations in Cleveland

two companies have them washed three times a week, and one, once a week.

Most companies, this canvass shows, require their station men to pay for the laundering or cleaning of uniforms. This work amounts to anywhere from 35 cents per suit, cleaned once a week, up to $1.50 per week charged by the company for laundering. A few make it optional with their men as to frequency of laundering and where to have it done.

A few companies require their men to buy the outfits outright, and two or three rent the suits to their men at a stated fee per month.

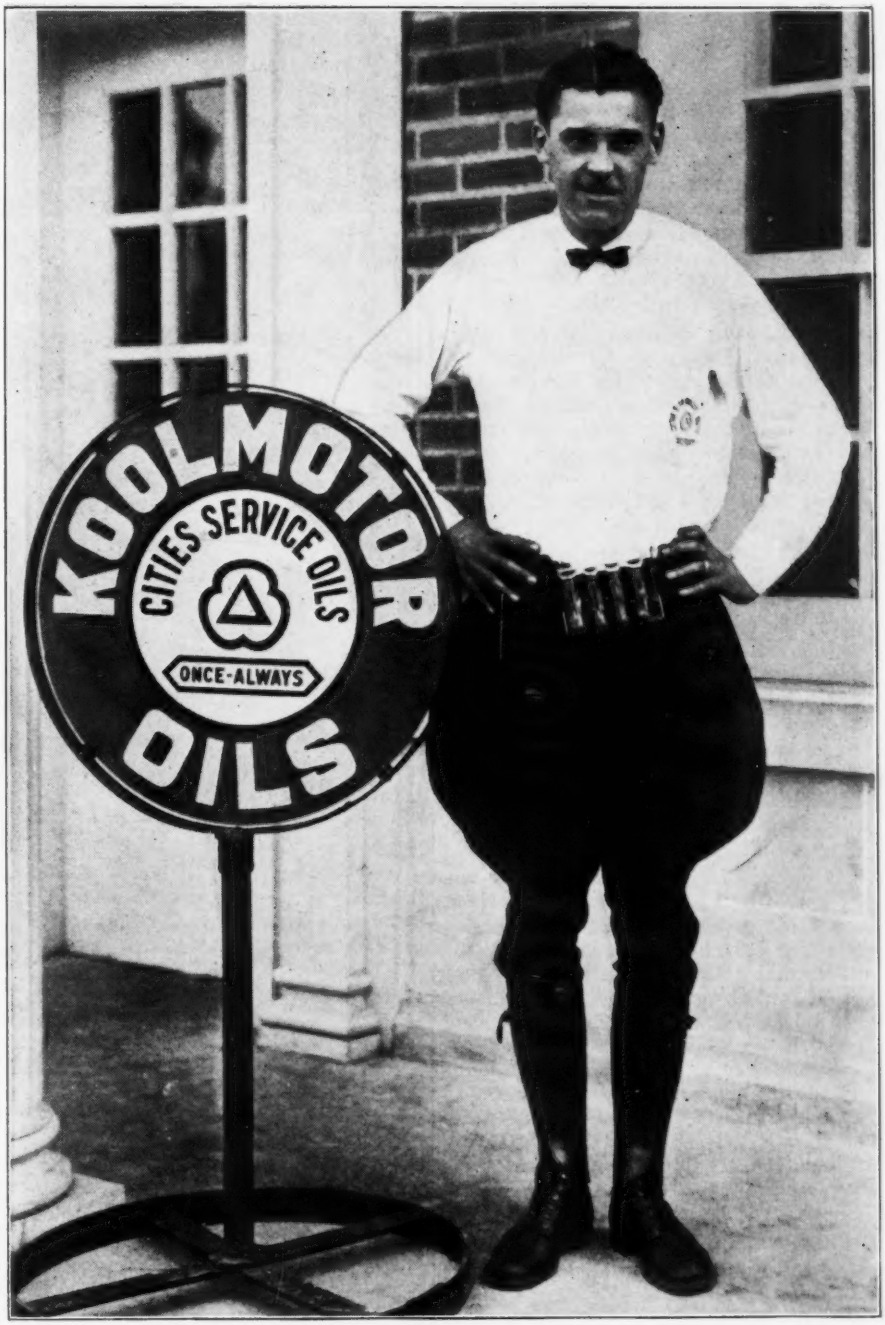
The Indian Refining Co., Lawrenceville, Ill., has a summer and winter uniform for its station attendants. The summer one is of blue and white pin stripe material. It consists of coat, trousers and blue cotton shirts. The winter shirt is of blue flannel. Blue sweaters are worn by the men during that time. Blue was chosen because the company finds it the most serviceable color. The uniforms are laundered twice a week and they are easy to wash. Cost of the summer uniform is $5.50 and of the winter outfit, $8.50. Cap is 75 cents extra for the summer outfit, and $1.50 extra for the winter.

L. B. Veeder, manager of service stations for the Indian, says that the upkeep of uniforms is $3 per month per man and "worth it." The station operator pays the company $2 a month as rental for the uniform and the company replaces it when necessary. Very favorable comments have been received by the company on these uniforms.

The Texas Co.'s experience with uniforms has been satisfactory. Forestry green is its color, chosen for its dignity, and because it does not soil easily. Light weight material is used in the summer and corduroy or wool in the winter. They are laundered once a week, and sometimes more often. Uniform upkeep is quite an item, according to F. L. Hanks. Commission stations only pay for their own outfits.

White was chosen by the General Petroleum Corp., Los Angeles, because it does not fade and looks clean when it is clean. That company sells white duck coats to its dealers at $2 each, and coveralls at $2.90 each. These prices are considerably below cost. The coat and coveralls are laundered twice a week which is paid for by the station operator.

A black and white uniform that fits into the general color scheme of the Cities Service Oil Co., Cleveland, has been adopted recently by that company. A white shirt, black bow tie, black breeches and black puttees constitute the summer uniform. The Cities Service emblem is lettered in the shirt pocket. There will be a black leather lumberjacket for winter wear. The summer outfit costs in the neighborhood of $18 or $20, and the winter one, around $25.



A snappy uniform is this new one of the Cities Service Oil Co., consisting of white shirt, black breeches, black leather puttees, and black bow tie. A black leather lumberjacket will be added in the winter. Price, from $17 *to* $25.

Each man will have six white shirts, which will be laundered every day, and two pairs of breeches. The breeches will go to the laundry once a week. Station men buy the uniforms and stand the expense of upkeep, according to A. J. Weaver, in charge of service stations.

Dark grey cotton whipcord with red trim is used for attendants' uniforms of the Municipal Service Corp., Long Island City, which operates 60 service stations in New York City. Grey was chosen for service and red for contrast. The men buy the outfits at $10 per uniform or two for $16. They are dry cleaned once a week at a reasonable price, one cleaner having the contract for all the work. The uniform consists of breeches, puttees, blouse, cap and shirt, according to N. K. Jensen, general manager.

White uniforms, because they are attractive and look clean, were used by the Standard Oil Co. of California, San Francisco, up to the time it leased out all of its stations. They were of duck material, consisting of pants and coat costing $4.50. They were easily laundered about every three days in an ordinary commercial laundry. Cost of laundering was about 50 cents per uniform which was paid by the station men, who also paid for these uniforms. Many favorable comments had been received by the company on the appearance of the attendants' uniforms, according to H. T. Hays, man-

ager of the service station sales department.

A uniform costing $6, consisting of pants, shirt and cap made of light tan duck, is being used by station men of the Lubrite Refining Co., St. Louis. This color does not show oil spots readily, the company says. Uniforms are washed every two days but the laundering is not so easy. Upkeep is very small, the company claims, and the station men do not help pay any part of this.

White twill is used by the Shell Petroleum Corp., St. Louis, as a symbol for the purity of its products. The uniforms are reasonably easily laundered, the company says, three times a week. Each man pays $1.50 per week for upkeep. Cost of uniforms is about $3.50 each.

The Liberty Bell Oil Co., St. Louis, pays $2.75 for a blue and white stripe duck uniform which it in turn sells to Independent station owners for $2 each, the company itself not operating service stations. These station owners pay for their laundering. They are washed one to two times a week and are easy to launder. The colors were chosen because they do not show the soil very quickly.

When uniforms are cleaned of grease, a special overall cleaning company in St. Louis does the work.

A sand color was picked out by the Porter Oil Co., Leavenworth, Kan., marketer of Shell products, because it made a suitable background for the Shell emblem. The uniforms are of drill, consisting of shirt and trousers for $3.50 per suit. They are washed once a week except when used on greasing work when more frequent laundering is necessary. It costs 75 cents per week to keep the uniforms clean, which is paid by the station attendant. He also pays for the uniform except for the lettering in the emblem.

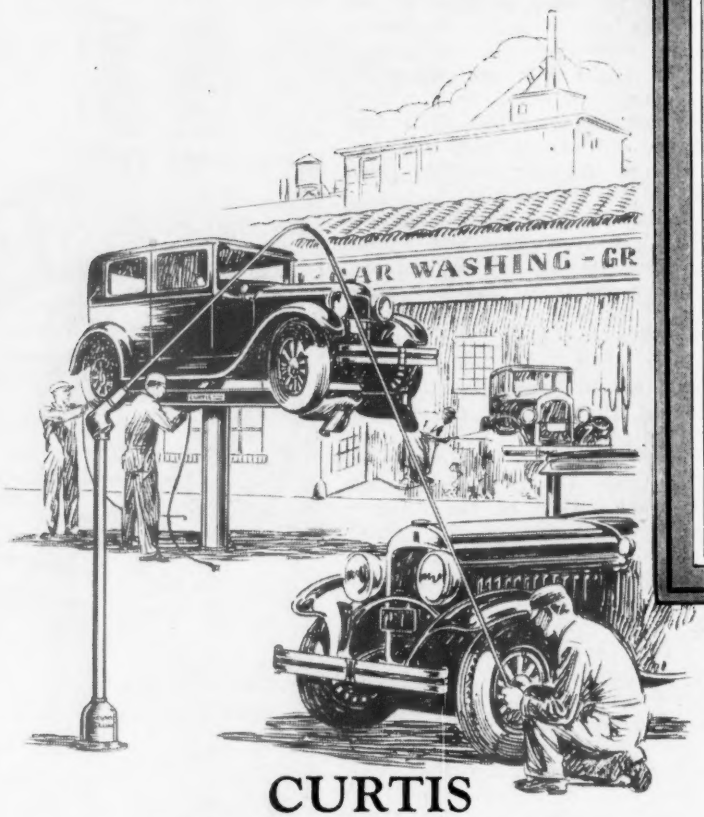
The National Refining Co., Cleveland, O., has this to say on the subject of uniforms, according to J. F. Mullay, manager of Ohio sales:

"We adopted uniforms for our service station men about four years ago and since that time it has been a trying experience to find a uniform that is truly suitable for the work.

"Since the original adoption of uniforms we have tried out four or five different kinds as well as colors, and it was not until just a few weeks ago that we came to the conclusion that we had found a uniform which we hope will prove satisfactory for permanent adoption.

"We originally had a hickory stripe coverall, and it was not long before we had decided that they were not neat enough, and on different occasions some of our men looked slovenly in them, so it was decided to change to khaki shirts and breeches with leather puttees. However, due to the quality of the material which we were forced to buy, the khaki color did not hold

The importance of



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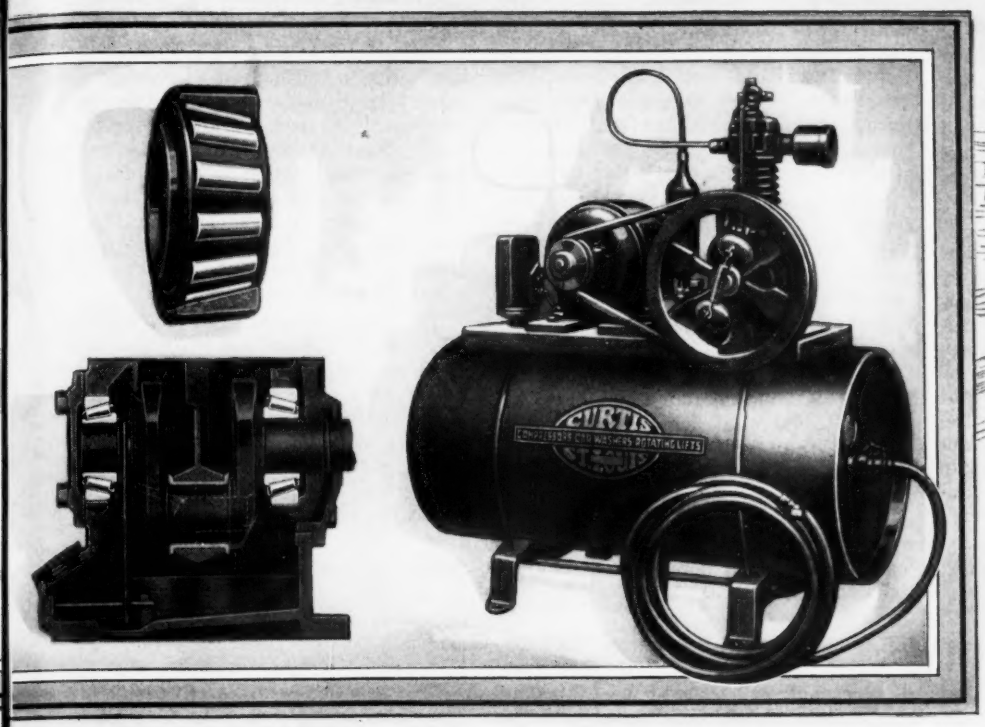
Curtis Hydraulic Car Washer

Curtis Air Stands—Reel and Tower types with or without water attachments.

"Timken Bearing Equipped"



Five important Curtis features: Timken Bearings; Centro-Ring Oiling; "V"-belt drive, which eliminates belt tightener; light rigid steel base and universal motor mounting.

NEW standards of super service have brought heavier duty to compressors—because of increased tire inflation and the wider use of car washers, lifts, lubrication devices, air tools and other modern equipment.

This has made old standards of compressor construction obsolete. And Curtis, as always, is first to recognize the need, and meet it, with a complete Timken-Bearing Equipped Line.

The importance of "Timken Bearing Equipped" cannot be over-stated because it provides the higher standards of compressor service now needed in three directions—

1. Greater economy — elimination of friction brings operating economies that in this day of heavy compressor service is of real money consequence.

2. Longer life—With practically no friction, there is practically no wear. "Timken Bearing Equipped" means years longer life. Lubrication costs become negligible; maintenance is practically eliminated.

3. With Timken Bearings, the tapered principle permits bearing adjustments for wear that keep Curtis compressors to highest efficiency all the time.

Another most important improvement is the Curtis Positive "Centro-Ring" Oiling System [Patents pending]. It is a development of the Curtis controlled splash system, but is as much of an improvement over that system as the controlled splash was over ordinary lubrication methods.

A ring lifts the oil from the reservoir to a special undercut groove in the crankshaft. Here, centrifugal force carries the oil under pressure through ducts to a chamber in the crankshaft. From this chamber, the oil is redistributed by centrifugal force to the ribs in the crankcase. These ribs catch the oil thrown by the revolving crankshaft and lead it directly and in controlled volume to each friction point.

In the Curtis Compressor there is no mere random splashing of oil which is so likely to cause excess oil to be carried in to the air lines.

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up, and after one or two washings, the khaki suits did not present a neat and tidy appearance, due to the fact that they were faded, and had turned practically white.

"It was then decided to adopt a gray shirt with gray breeches and black puttees. However, some of our men complained about the puttees being too warm in the summer time, and gray shirts did not effectively hide the dirt which is bound to appear, due to the nature of the work at filling stations.

"We then adopted a white uniform with a black stripe in it. Feeling that perhaps our men could bring themselves to realize that they must present a tidy appearance at all times, and that the white uniforms would be an incentive for them to be careful of their clothing, knowing that the white would soil more easily than any other color. However, they could not be cleaned effectively, the uniform cloth being eaten by acid, etc., that was used to clean them by the cleaning company.

"We therefore have adopted at the present time a dark bluish gray coverall of very serviceable material and which does not show the dirt readily and cleans up in fairly good condition. We have not had them long enough, however, to come to a definite conclusion, although all indications point to the fact that we will standardize on this particular uniform.

"We do not require that the uniforms be sent to any particular company for cleaning, inasmuch as our service station men stand this expense themselves, and they are privileged to have them cleaned at any cleaning company they choose.

"Our present uniforms cost approximately $2.75 and our men are required to have at least enough suits so that they will be able to change twice a week. That is one of the reasons why we have selected a dark colored uniform in order that they will not become soiled so easily, or at least the dirt will not show so readily, thus keeping the expense for the men as low as possible."

The White Star Refining Co., Detroit, up to June 1 of this year used a blue and pin stripe coverall and since then, khaki and green stripe coats. These coats are of a good grade of shrunk denim and cost $3.50 each per 10 dozen lots. They are laundered at least once a week. The attendant pays for the laundering.

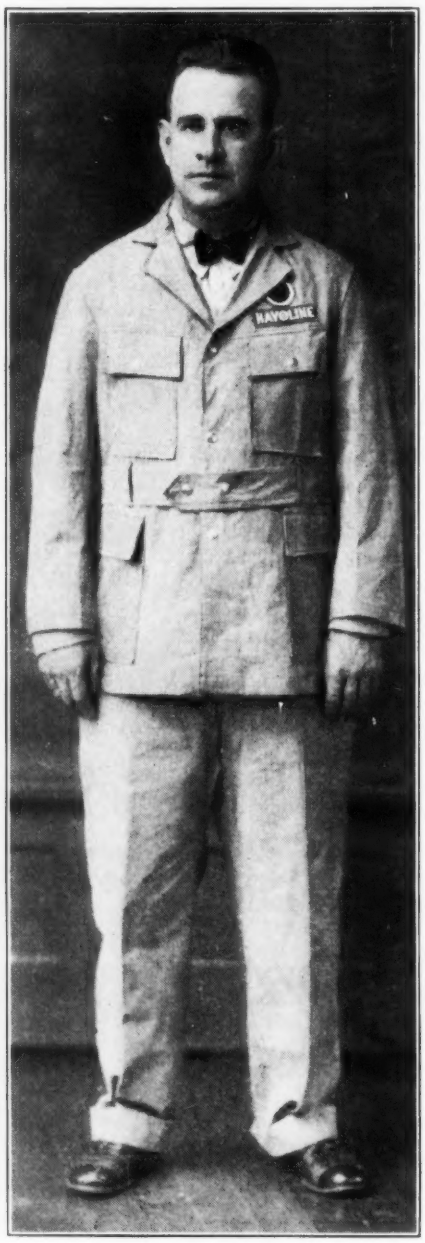
The Pocahontas Oil Co., Cleveland, has chosen blue as its color because it holds its color and does not show dirt so readily. Uniforms are of heavy serge and cost $17 each. The attendant pays the laundering and they are washed once a week. Uniforms are sent to the Overall Rental Co., Cleveland, for removing grease.

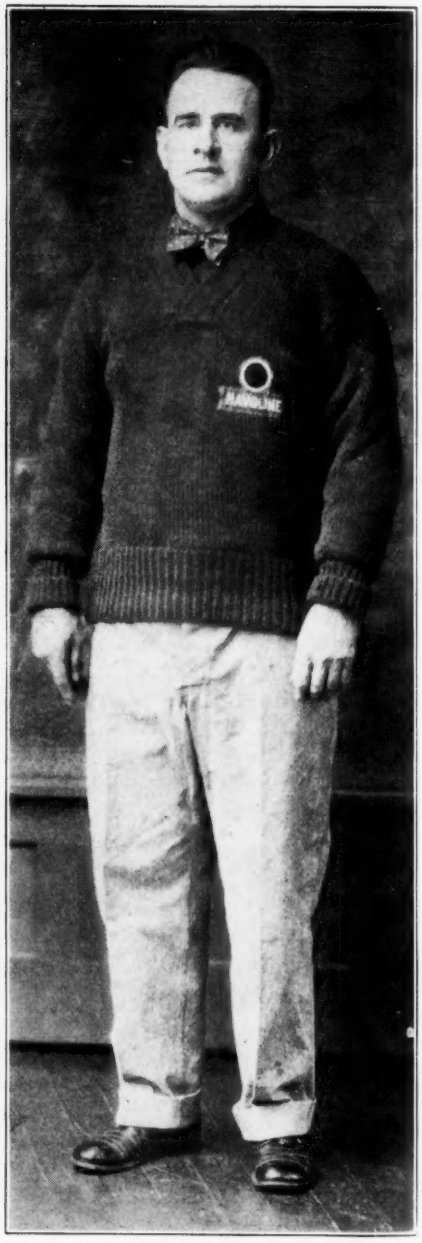
Because white looks better, neater and cooler, the Champlin Refining Co., Enid, Okla., chose it for service station attendants, while tank wagon drivers wear khaki. Attendants' uniforms are of herringbone, costing $3.25 each, including lettering. They are washed every two or three days without trouble. The attendant pays for laundering.

Brown, because it is the most practical of all colors, is used by the Continental Oil Co., Denver, for its uniforms. The outfit consists of khaki coveralls costing $3.25 each. These coveralls are not washed but are dry cleaned once to twice each week at 50 cents per suit. Washing tends to fade the color through the use of strong alkali soaps, E. C. Halsey, manager of the service station department, says. Any good dry cleaner can do the work. The company assumes all laundering and cleaning costs.

Waverly Oil Works Co., Pittsburgh, uses black with red lettering because it considers these the most serviceable colors. The uniforms are black wool shirts with red lettering and rib cord puttees. These cost approximately $16 each. They are dry cleaned twice a week by the Overall Cleaning Co., Pittsburgh. For this there is a charge of $1 per week, which the company assumes.

The color scheme of the Beacon Oil Co., Everett, Mass., is reflected in its uniforms of grey cap and breeches, green and black checked blouse, and black puttees. They are of cotton and worsted material and have been found satisfactory. Cost of the uniform is $12.75 each. They are laundered weekly at a cost of 35 cents per





Summer and winter uniforms, respectively, of Indian Refining Co. station attendants. Summer outfit is of blue and white pin stripe cotton material, consisting of coat, trousers and shirt. Price, $5.50. To the winter uniform is added a blue sweater and the shirt is blue flannel. Price, $8.50.

garment. The station operator does not pay for the laundering but he does pay a half of the initial cost of the uniform.

Motorists have commented on the attractive and neat appearance of these uniforms, the company says.

The Automobile Gasoline Co., St. Louis, has been using a white herringbone drill, one-piece suit, because of its neat appearance. Cost was $2.50 per suit. They were laundered once a week but became discolored after a time, the company says. Laundering fees were 35 cents per suit. The employe paid all costs.

A blue and white pin stripe uniform, with the company's advertisement on the back of each suit in red letters, is being used by the Anthony Oil Co., Fort Wayne, Ind. These colors were picked because of neat appearance and because they do not show dirt so quickly. They are of regular coverall material and cost $2.65 each. Each attendant has two suits, one being laundered each week. The company furnishes the suit and the employe pays for laundering. All uniforms are sent to the same cleaner for removal of grease spots. Motorists have commented on the clean and neat appearance of the attendants.

The American Oil Co., Savannah, Ga., recently adopted a grey cotton uniform at a cost of $4 per suit. These are washed twice a week and they are paid for by the station operator who is a commission agent.

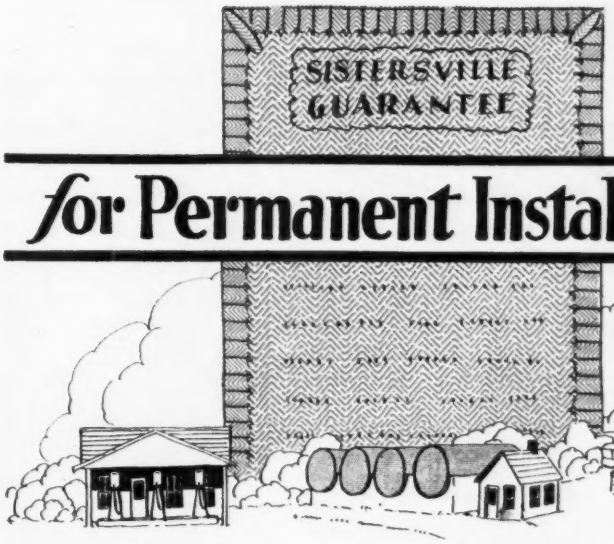
The Washington Oil Co., Washington, Mo. uses Sinclair Refining Co.'s color scheme in its uniforms. These cost $2.90 each and are laundered twice a week.

Cream color to match the station and pumps is used by the Berger Oil Co., Berger, Mo. in its uniforms. These are of duck. They are washed weekly, the company assuming all expenses of upkeep.

CLEVELAND, Dec. 5.—Nebraska jobbers have filed suit to obtain a full refund of the Nebraska gasoline tax on motor fuel exported from the state. Morris Rosenblatt of the Consumers Oil Co., Omaha, is plaintiff in the case.

Under a recent ruling in the state jobbers exporting gasoline into adjacent states can obtain a refund equal only to the amount of the gasoline tax which must be paid in the state in which the fuel is sold. Nebraska has a 4-cent tax and Iowa a 3-cent tax. Under the ruling Nebraska jobbers must pay a 1-cent tax in Nebraska and 3-cent tax in Iowa on business done in the latter state, or build bulk plants in Iowa.

An effort was made to get the Nebraska supreme court to take original jurisdiction in the controversy but the court held that the case should be tried first in a district court.



for Permanent Installations

SISTERSVILLE Tanks are designed for permanent installations no matter whether the capacity is 200 gals. or 26,000 gals. They are not constructed for the "over-night" station that opens in the spring and disappears in the fall. They are built to serve, day in and day out, year after year, faithfully and honestly.

And in the background always, is the Sistersville guarantee—an earnest manufacturer's promise of performance.

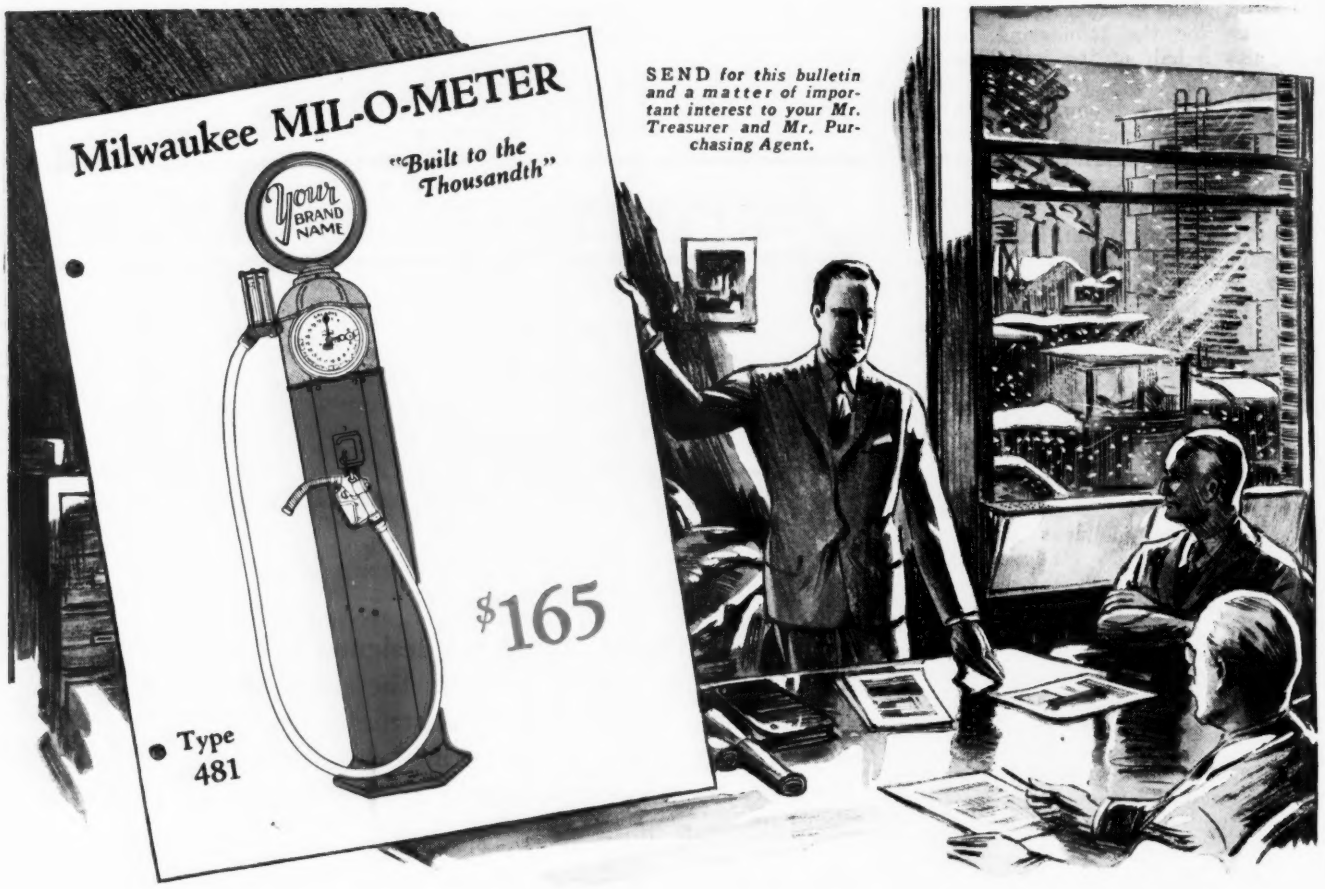
[Our free illustrated catalog will be mailed on request.]

SISTERSVILLE TANKS

SISTERSVILLE TANK & BOILER WORKS
Sistersville, W. Va.

STEEL
DRUM ACCESSORIES
CORPORATION
Buffalo, New York
Specialists in Drum Faucets and Gates

Specify
the "BLUE" Gate
and our various types of DRUM FAUCETS
for all purposes.
We solicit your inquiries for detail information.


Milwaukee MIL-O-METER
"Built to the Thousandth"
Your BRAND NAME
$165
Type 481
SEND for this bulletin and a matter of important interest to your Mr. Treasurer and Mr. Purchasing Agent.

Gentlemen—let's make hay while the snow flies

"FOR once, let's keep winter from putting any brakes on *this* oil company! I say, instead of waiting till the hurry of Spring to clean house at our own stations and our dealer outlets —let's get busy and *do our planning now* . . " For one thing, we've got to 'go modern' on putting in meter pumps or we'll be looking at competition from the rear. I'm convinced that right here in this Milwaukee MIL-O-METER is the best thing for us in quality, appearance, price . . .

"Motion-carried"

" Gentlemen, I move for your consent to let me write to these people taking up their proposal for special co-operation with us NOW in making our pump question a settled one *this winter* instead of trusting it to the pressure of Spring . . . . " Thank you. My letter is all written to —

MILWAUKEE TANK WORKS, INC., *Milwaukee, Wisconsin*

Disposition of Gasoline Tax Funds Reported by Government

CLEVELAND, Dec. 5

ALTHOUGH there was an addition of one state to the group that appropriates gasoline tax funds for non-highway purposes, the total money so appropriated was less in the first half of 1929 than in the first half of 1928, according to gasoline tax statistics of the U. S. Bureau of Public Roads.

Gasoline tax funds not used on highways amounted to $3,556,349 the first half of this year or 2.03 per cent of the $175,054,894 taxes collected. In the first half of 1928 such appropriations amounted to $4,038,-074 or 2.7 per cent of the $140,534,-482 gasoline tax receipts.

Gallonage taxed totaled 5,693,872,-662 gallons for six months this year and with consumption estimated for Illinois for the six months and for New York for January, February, March, and April approximate grand total demand in the half year was 6,475,000,000 gallons. In the first half of 1928 the approximate demand was 5,533,000,000 gallons, an increase of 942,000,000 gallons or 11.6 per cent this year.

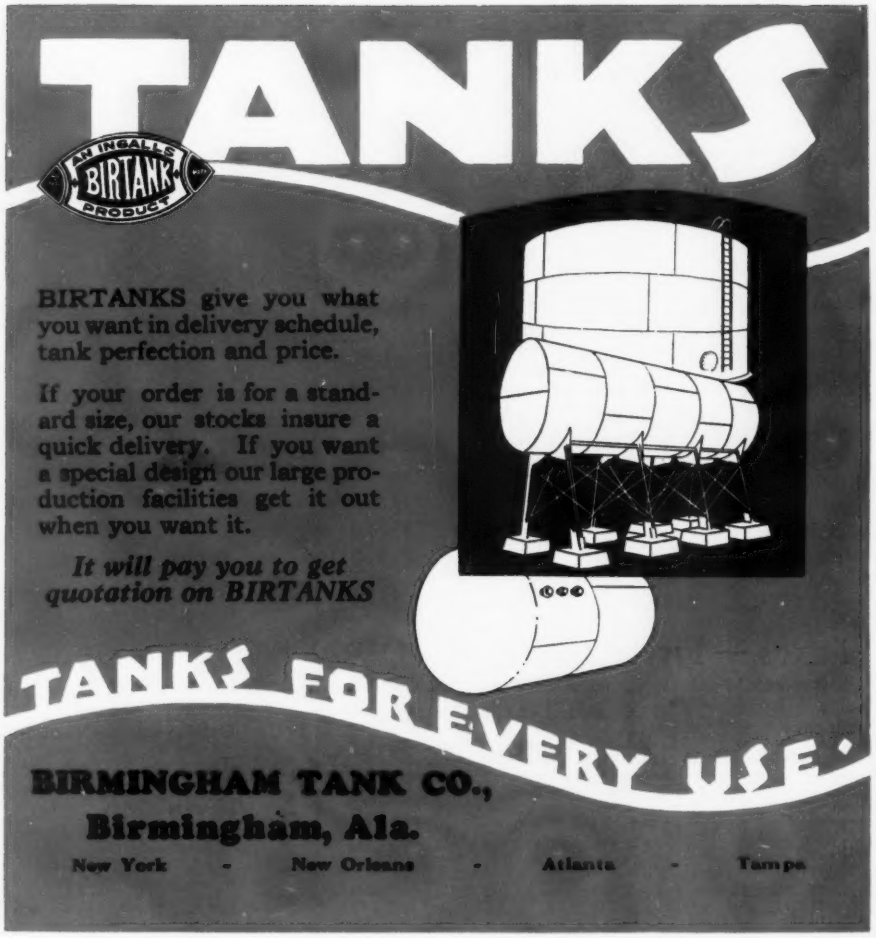
California again paid the largest sum in gasoline taxes, $16,023,275 as compared with $14,564,290 the first half of 1928. Pennsylvania was second with payments that totaled $14,-785,596 net as compared with $10,-095,950 the year before. Ohio was a close third this year with $14,622,-

Gasoline Taxes — First Half Year of 1929

(Compiled by U. S. Bureau of Public Roads from state records and reports)

State	Gross Tax Assessed Prior to Deduction of Refund	Exemption Refund: (Deducted from Gross Tax)	Total Tax Earning onFuel for Motor Vehicles	Disposition of Grand Total Earning: Collection Cost	Const. & of Rural State Highway	Maint. Roads Local Roads	State & County Road Bond Payment	For Miscel. Purposes	Net Gallons of Gasoline Taxed and Used by Motor Veh. 1929	Net Gallons of Gasoline Taxed and Used by Motor Veh. 1928
Alabama	$3,319,306	.....	$3,319,306	$ 17,884	$ 982,989	$1,658,978	$ 669,832	.....	82,982,649	79,630,514
Arizona	1,372,592	$ 170,672	1,201,920 [2]	.....	751,204	450,720	.....	.....	30,048,012	23,596,485
Arkansas	2,975,986	.....	2,975,986	89,280	743,996	476,158	[3] 1,666,552	.....	59,519,727	49,815,893
California	17,680,059	1,656,784	16,023,275	12,339	10,673,957	5,336,979	.....	.....	534,109,165	490,841,699
Colorado	2,423,815	165,128	2,258,687 [4]	22,146	1,565,988	643,291	.....	[5] $ 27,847	67,497,095	61,706,339
Connecticut	1,762,028	.....	1,762,028	.....	1,800,102	.....	.....	.....	88,101,396	75,956,950
Delaware	436,698	17,214	419,484	.....	419,484	.....	.....	.....	13,982,812	12,128,113
Florida	5,993,304	.....	5,993,304	12,045	3,595,982	1,198,661	.....	[6] 1,198,661	119,866,085	122,814,389
Georgia	4,066,983	.....	4,066,983	4,200	2,539,239	1,015,696	.....	[7] 507,848	101,674,584	96,602,870
Idaho	842,649	77,508	765,141	8,839	756,302	.....	.....	.....	19,128,535	19,048,158
Illinois [8]	.....	.....	.....	.....	.....	.....	.....	.....	[9]	[25] 41,841,273
Indiana	7,147,029	243,736	6,903,293	11,619	5,168,956	1,292,239	.....	[10] 430,746	194,262,855	168,111,459
Iowa	4,354,471	318,668	4,035,803	10,227	2,371,576	1,654,000	.....	.....	134,526,754	132,400,153
Kansas	4,013,474	375,861	3,637,613 [11]	.....	2,837,613	800,000	.....	.....	137,589,613	123,070,949
Kentucky	3,393,491	.....	3,393,491	12,839	3,386,761	.....	.....	.....	67,869,832	58,565,506
Louisiana	3,140,033	235	3,139,798 [11]	.....	2,376,642	.....	763,156	.....	80,674,322	78,394,079
Maine	1,378,808	42,014	1,336,794	8,758	830,023	498,013	.....	.....	33,069,734	27,950,183
Maryland	2,737,643	88,144	2,649,499	1,250	2,118,599	.....	[12] 529,650	.....	66,237,483	63,144,210
Massachusetts	4,413,428	63,501	4,349,927	.....	3,027,550	930,884	230,546	[10] 160,947	217,496,356	[26] .....
Michigan	10,605,138	961,831	9,643,307	60,000	2,101,307	5,400,000	2,082,000	325	321,443,578	260,469,220
Minnesota	3,530,079	196,128	3,333,951 [13]	.....	2,722,771	611,180	.....	.....	136,138,526	128,429,570
Mississippi [14]	3,376,618	.....	3,376,618	2,700	1,284,425	1,986,048	.....	[15] 103,445	66,255,606	59,144,837
Missouri	3,484,007	62,298	3,421,709	33,050	3,388,659	.....	.....	.....	171,085,442	162,017,139
Montana	1,423,363	259,627	1,163,736	6,621	1,157,115	.....	.....	.....	24,748,641	29,678,808
Nebraska	3,322,204	16,645	3,305,559	3,750	2,614,899	686,910	.....	.....	96,521,352	92,950,552
Nevada	302,819	20,978	281,841	.....	229,610	52,231	.....	.....	7,046,023	5,886,363
New Hampshire	880,655	26,963	853,692	304	640,041	.....	213,347	.....	21,342,298	17,467,048
New Jersey	4,505,725	.....	4,505,725	9,000	4,463,087	.....	.....	[16] 45,000	225,286,231	190,302,725
New Mexico	1,015,565	.....	1,015,565	20,385	781,876	.....	217,000	.....	20,311,308	16,725,016
New York [17]	4,728,954	47,972	4,680,982	14,573	3,462,307	923,282	.....	[18] 280,820	[19] 234,049,092	[27] .....
North Carolina	5,280,726	210,528	5,070,198	5,070	2,493,418	211,710	2,360,000	.....	121,362,188	113,071,232
North Dakota	900,033	372,033	528,000	12,000	516,648	.....	.....	.....	26,400,010	25,505,784
Ohio	15,058,842	435,867	14,622,975	.....	9,139,359	2,924,595	.....	[10] 2,559,021	427,495,801	373,270,435
Oklahoma	4,265,073	13,199	4,251,874	.....	2,855,765	1,396,109	.....	.....	143,928,743	127,386,017
Oregon	2,098,474	155,458	1,943,016	3,569	1,939,447	.....	.....	.....	65,118,022	58,373,919
Pennsylvania	14,785,596	.....	14,785,596	.....	12,321,330	2,464,266	.....	.....	492,853,183	336,531,666
Rhode Island	722,514	55,097	667,417 [20]	.....	500,563	.....	166,854	.....	33,370,839	26,849,982
South Carolina	3,087,617	12,334	3,075,283	.....	2,197,538	879,347	[21]	.....	54,849,377	51,918,610
South Dakota	1,712,153	649,594	1,062,559	5,500	634,351	.....	422,708	.....	26,563,978	26,194,112
Tennessee	3,920,901	.....	3,920,901	19,604	2,340,778	780,259	780,260	.....	86,710,635	75,883,429
Texas	7,220,581	.....	7,220,581	.....	5,415,741	.....	.....	[22] 1,804,840	361,029,066	310,325,590
Utah	871,277	.....	871,277	2,263	95,266	.....	773,900	.....	24,893,622	22,199,298
Vermont	591,101	.....	591,101	.....	591,101	.....	.....	.....	16,170,984	12,684,822
Virginia	4,610,263	229,345	4,380,918 [23]	.....	3,066,643	1,314,275	.....	.....	87,618,352	78,026,337
Washington	2,318,711	177,473	2,141,238	.....	2,141,238	.....	.....	.....	107,061,898	95,774,750
West Virginia	2,121,927	76,522	2,045,405	.....	545,405	.....	1,500,000	.....	51,135,119	45,662,258
Wisconsin	3,196,859	229,620	2,967,239	5,000	1,090,789	1,657,876	.....	[10] 213,574	148,361,965	141,912,768
Wyoming	418,140	147	417,993	754	367,364	49,875	.....	.....	12,268,495	12,326,711
Dist. of Col.	680,164	3,858	676,306	.....	.....	.....	.....	[10] 676,306	33,815,279	29,805,315
TOTAL	.....	.....	175,054,894	415,569	117,045,804	37,293,582	11,846,155	8,539,030	[24] 5,693,872,662	[28] 4,652,393,535

1 Back taxes on 518,839 gallons at 2 cent tax.
2 Paid $4,550 from State Highway Fund.
3 Only about 1/7th for State Bonds.
4 Includes expenses of State Inspector of Oils.
5 For city and town streets.
6 Includes $799,107 for public schools, and $399,554 for permanent building fund.
7 For public schools.
8 Gasoline tax of 3 cents not effective until August 1.
9 Estimated consumption (not taxed), 390,000,000 gallons.
10 For city streets.
11 From State General Fund, $7,500.
12 For Baltimore city streets and city grade crossing elimination.
13 Appropriated about $8,250 from State Treasury.
14 Includes earnings from addition tax in Harrison and Hancock counties.
15 For sea-wall to protect road.
16 For State Department of Commerce and Navigation.
17 Figures cover only months of May and June.
18 Includes $50,000 in Revolving Fund, and $230,820 to N. Y. City.
19 Estimated consumption of first four months not taxed 391,000,000 gallons.
20 State appropriation, $5,000.
21 Payments on county bonds included with local road allotment.
22 Free School Fund.
23 State appropriation, $5,816.
24 Approximate grand total consumption including gasoline not taxed in Illinois and New York. 6,475,000,000 gallons.
25 Total consumption estimated at 321,000,000 gallons.
26 Total consumption estimated at 165,000,000 gallons.
27 Total consumption estimated at 436,000,000 gallons.
28 Approximate grand total 5,533,000,000 gallons.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AN INGALLS PRODUCT
BIRTANK
BIRTANKS give you what you want in delivery schedule, tank perfection and price.
If your order is for a standard size, our stocks insure a quick delivery. If you want a special design our large production facilities get it out when you want it.
It will pay you to get quotation on BIRTANKS
TANKS FOR EVERY USE
BIRMINGHAM TANK CO.,
Birmingham, Ala.
New York - New Orleans - Atlanta - Tampa

975 as compared with $11,198,113 last year.

With its consumption of gasoline estimated at 391,000,000 gallons the first four months and taxes paid of 234,049,092 gallons in May and June, New York led in total gallonage with 625,049,092. California was second with 534,109,165 and Pennsylvania third with 492,853,183 gallons. Ohio had a gallonage of 427,495,801, Texas 361,029,066, and Michigan 321,443,578.

Appropriation of gasoline tax funds for non-highway purposes in the various states was as follows:

	1929	1928
Florida—Free schools	$799,107	$818,762
Florida—Permanent buildings	399,554	409,381
Georgia—Schools	507,848	482,489
New Jersey—State Department of Commerce and Navigation	45,000	.....
Texas—Free school fund	1,804,840	2,327,442
Total	$3,556,349	$4,038,074

On the basis that 45 per cent of the year's total demand for gasoline was in the first half year, the indicated demand for motor vehicles and partly for other purposes for 1929 should reach 14,388,000,000 gallons or 342,333,000 barrels. This volume for the most part does not include gasoline used in tractors, airplanes, motor boats, and in construction machinery.

DAMASCUS

Coldflo Greases

for

Transmissions

Damascus Mfg. Corp.
9501 Cassius Ave.
Cleveland Ohio

Tax Rate in 1929

State	Jan. 1	June 30	Date of Change
Alabama	4	4	.....
Arizona	4	4	.....
Arkansas	5	5	.....
California	3	3	.....
Colorado	3	4	May 1
Connecticut	2	2	.....
Delaware	3	3	.....
Florida	5	5	.....
Georgia	4	4	.....
Idaho	4	4	.....
Indiana	3	4	Apr. 1
Iowa	3	3	.....
Kansas	2	3	Apr. 1
Kentucky	5	5	.....
Louisiana	2	4	Jan. 4
Maine	4	4	.....
Maryland	4	4	.....
Massachusetts	2	2	.....
Michigan	3	3	.....
Minnesota	2	3	May 1
Mississippi	5	5	.....
Missouri	2	2	.....
Montana	3	5	Apr. 1
Nebraska	2	4	Apr. 1
Nevada	4	4	.....
New Hampshire	4	4	.....
New Jersey	2	2	.....
New Mexico	5	5	.....
New York	..	2	May 1
North Carolina	4	5	Mar. 4
North Dakota	2	2	.....
Ohio	3	4	Apr. 27
Oklahoma	3	4	June 22
Oregon	3	3	.....
Pennsylvania	3	3	.....
Rhode Island	2	2	.....
South Carolina	5	6	Mar. 16
South Dakota	4	4	.....
Tennessee	3	5	Feb. 17
Texas	2	2	.....
Utah	3½	3½	.....
Vermont	3	4	Apr. 1
Virginia	5	5	.....
Washington	2	2	.....
West Virginia	4	4	.....
Wisconsin	2	2	.....
Wyoming	3	4	Apr. 1
Dist. Columbia	2	2	.....
Arithmetical average			3.07

The Bureau of Mines for the first six months showed domestic shipments that totaled 172,702,000 barrels whereas the tax figures with the New York and Illinois estimates showed only 154,071,000 barrels. The tax gallonage is net for motor vehicle use in many of the largest consuming states and does not include gasoline used by the four classes of consumers mentioned in the preceding paragraph.

The Bureau of Mines showed an increase of 15.25 per cent in domestic gasoline shipments in the first half of 1929 over shipments the first half of 1928 and 14.4 per cent increase in the nine months ended Sept. 30 over the corresponding time last year.

The larger gain shown by the Bureau of Mines over the figures of the Bureau of Public Roads was undoubtedly due to the increase of flying, power boating, farming with tractors, the swing from steam engines to internal combustion engines in building and road construction, and to increased industrial activity, particularly in the automotive field.

This assumption is borne out by some of the refund figures compiled by the Bureau of Public Roads. Tax refunds in Michigan this year amounted to $961,831 as compared with $784,276 last year, a reflection of the larger automobile production. In Iowa refunds this year amounted to $318,668 and last year to $269,540, indicating that more gasoline was consumed in farming. These states had a 3-cent tax each year.

Comparable costs of collecting the tax are not available. Some states charge the collection cost against the tax but in many states the collection costs are hidden in the expenses of bureaus and commissions that have other functions. The expenses of these bureaus and commissions are usually paid from state general funds.

The accompanying table shows the amount of taxes collected by the several states, the exemptions, distribution of receipts, and net taxed gallonage.

Sign Post Halts Tourists at Station

CLEVELAND—A sign post giving the mileage to nearby cities and towns is placed in the grass plot in front of the Wolverine Service Station at South Haven, Mich., operated by A. D. Dubuisson.

Sign posts are of interest to tourists who will either stop or slow down in order to find out the distance to the next city. By placing one at the station the tourist's attention is called to his gasoline and oil needs.

Dorothy Dubuisson, at right, daughter of A. D. Dubuisson, was Silver Fleet Queen when the Silvertown fleet of the Goodrich Rubber Co. was in South Haven, Mich., and presented Commander Schaeffer of the fleet. The fleet stopped at the Wolverine Service Stations

The greasing palace at this station has been in operation since June 5, 1927. Following are lists of work done at the station.

Cars Greased

June 5, 1927 to March 1928.....1400
June 5, 1927 to March 1929.....3181
June 5, 1927 to Oct. 1, 1929.....4724

Cars Drained

June 5, 1927 to March 30, 1928....2800
June 5, 1927 to March 1929.....6209
June 5, 1927 to Oct. 1, 1929.....8605

Cars Drained

June 1927 to March 30, 1928.....3500
June 1927 to March 1929.....7906
June 1927 to Oct. 1, 1929.....12,942

The Silvertown fleet of the Goodrich Rubber Co. stopping at A. D. Dubuisson's Wolverine Service Station in South Haven, Mich.

Save your customers winter grief

Specify Mobiloil Arctic for cold-weather driving

When the thermometer drops down around 32° F., it's high time to warn your customers against driving with summer oil in their crankcases.

Unless lubricating oil is scientifically correct for cold weather conditions, four things are bound to follow:

1. Hard starting
2. Run-down batteries
3. Needless wear and tear resulting from insufficient lubrication
4. Burned-out bearings due to lack of oil distribution

There are many so-called "winter oils" thin enough to give easy starting. But that's not enough. After the engine has reached high operating temperatures, these oils may break down and fail to do a thorough lubricating job.

Mobiloil Arctic combines the two qualities absolutely essential in correct cold weather lubrication—perfect fluidity at winter temperatures, together with full, rich lubricating body under the most extreme winter operating conditions. This distinctive "double-range" feature accounts for Mobiloil Arctic's widespread use in such far northern countries as Denmark, Norway, Sweden and Finland.

Give your customers "double-range" protection with Mobiloil Arctic.

the New GARGOYLE

Mobiloil

ARCTIC

VACUUM OIL COMPANY, New York, Chicago, Philadelphia, Boston, Detroit, Pittsburgh Cleveland, Minneapolis, Kansas City. *Other branches and distributing warehouses throughout the country*

National Petroleum Association Plans Year of Intensive Activity

CLEVELAND, Dec. 6

AN INTENSIVE program of association activity is being mapped out by the National Petroleum Association as a result of a meeting of trustees at Pittsburgh on Nov. 14. At this meeting the department personnel for the coming year was approved and plans laid for the general activities of each department.

The manufacturing department particularly has a big schedule of work ahead of it under the leadership of P. S. Tarbox of the Independent Refining Co., Oil City, Pa., trustee in charge.

Within the past few months several member companies have completed the installation of new equipment in various phases of refinery operations. These companies have agreed to furnish complete reports of results they are obtaining with the new equipment for the study of the department and member companies.

In recent years one of the most important phases of the association's work has been conducted by the department of manufacturing. Plant managers, process foreman and executives have had an opportunity to visit other plants with similar manufacturing problems to compare results of the various types of equipment and operating conditions. The free manner in which the men in charge of manufacturing have exchanged ideas has brought the whole level of practice in the Appalachian district to a higher level and been a factor in reducing costs.

Study of the new equipment now in operation in coming months is expected to yield important results to members who take advantage of the opportunity the association provides.

The division of fire prevention and safety also is planning an even more active year than last. The association has obtained the cooperation of the U. S. Bureau of Mines in training plant employees in these two important lines.

Pennsylvania tax problems particularly are to be attacked by the division of legislature and litigation. Just now the division is working with the state attorney general to clear up the matter of taxation of gasoline used in various manufacturing processes.

As a general rule trustees who attended the Pittsburgh meeting indicated that they are hopeful of the general outlook for the industry next year. Recent voluntary proration in California and Oklahoma was looked on as being particularly significant of our industry's attitude toward bringing output in line with consuming requirements. Discussion of the Appalachian situation brought out the opinion that the increase in production due to modern methods has not been sufficient to cause trouble.

Following is the organization set-up of the association's department as approved at the meeting:

Economics, Accounting and Statistics

T. J. Hilliard, Waverly Oil Works, Pittsburgh, trustee in charge. Councillors: M. A. Brewster, The Pennzoil Company, Oil City, Pa.; S. J. Brill, Kendall Refining Co., Bradford, Pa.; Clarence J. Fox, Emlenton Refining Co., Emlenton, Pa.; H. A. Gidney, Gulf Refining Co., Pittsburgh, Pa.; J. E. Johnson, Waverly Oil Works Co., Pittsburgh, Pa.

Legislation and Litigation

Sheldon Clark, Sinclair Refining Co., Chicago, trustee in charge. Councillors: Frank R. Coates, Crew Levick Co.-Empire Refineries, New York; M. F. Cowden, Pennsylvania Oil Products Refg. Co., Warren, Pa.; Wm. A. McAfee, Standard Oil Co. of Ohio, Cleveland; Samuel Messer, James B. Berry Sons' Co. Inc., Oil City, Pa.; H. F. Stone, Gulf Refining Co., Pittsburgh, Pa.

Manufacture

(a) Division of Manufacturing: P. S. Tarbox, Independent Refining Co., Oil City, Pa., trustee in charge. Councillors: Earl E. Bown, Kendall Refining Co., Bradford, Pa.; D. W. Hovey, Waverly Oil Works Co., Pittsburgh, Pa.; Harry R. Lewis, Conewango Refining Co., Warren, Pa.; F. J., McGraw, Oil Creek Refining Co., Titusville, Pa.; J. B. Northrop, Ohio Valley Refg. Co., St. Marys, W. Va.

Bradford Group: Bradford Oil Refining Co.; Kendall Refining Co.; Pennsylvania Oil Products Refining Co.; Sinclair Refining Co.

Butler Group: W. H. Daugherty & Son Refining Co.; Pennsylvania Refining Co.; Tri-State Refining Co.; Valvoline Oil Co.

Oil City, Titusville, Franklin Group: American Oil Works Co.; Continental Refining Co.; Crew Levick Co.; Crystal Oil Works; Emlenton Refining Co.; Empire Oil Works; Franklin Creek Refining Corp.; Independent Refining Co.; Oil Creek Refining Co.; Penncrude Refining Co.; Pennzoil Co.

Pittsburgh Group: Canfield Oil Co.; Freedom Oil Works Co.; A. D. Miller Sons' Co.; Waverly Oil Works Co.

Warren Group: Conewango Refining Co.; Mutual Refining Co.; Levi Smith Refining Co.; Superior Oil Works; Swan-Finch Refining Co.; Tidioute Refining Co.; Tiona Refining Co., United Refining Co., Valvoline Oil Co.; Viking Oil Corp.; Warr-Penn Refining Co.

West Virginia Group: Ashland Refining Co.; Elk Refining Co.; Ohio Valley Refining Co.; Pure Oil Co.

(b) Division of Scientific Research, G. C. Davison, trustee in charge. Councillors; G. D. Brandt, Crew Levick Co., New York; J. S. Harrison, Standard Oil Co. of Ohio, Cleveland; Dr. J. B. Rather, Standard Oil Co. of New York, New York; C. R. Wagner, Pure Oil Co., Chicago; W. S. Zehrung, The Pennzoil Co., Oil City, Pa.

Membership and Relations

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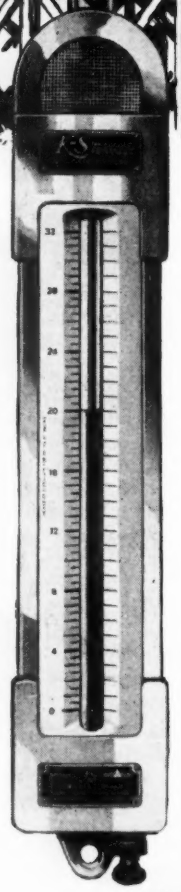
THE HYDROSTATIC DISTANT READING GAUGE



Let Gravity Fill Your Tanks

The Peerless Oil Co., Cleveland, Ohio, keep a K-S Telegage on guard on all their upright gasoline tanks. By thus keeping careful watch on the contents of each tank, they are able always to have a good head of gasoline in each tank, as that tank truck loading can easily be done by gravity. Since installing the Telegage they have had no occasion to resort to the pump for truck loading.

Central control is now an actual fact in many tank yards for with a battery of K-S Telegages the measuring stick and tape have become things of the past.

Day and night, with ease and dependability, the K-S Telegage tells at a glance the depth of liquids in storage tanks. Placed conveniently in office or control room, this scientific instrument guards your petroleum products against checking errors and production losses. The reliability of the Telegage is assured by the fact that it is a product of the world's largest maker of distant reading gauges.

Write for complete information, giving a full description of your requirements. Give the Baume or Specific Gravity of each liquid to be measured, the distance from tank to desired location of gauge, and size of tank. Descriptive folder sent on request.

KING-SEELEY CORPORATION
308 Second Street Ann Arbor, Michigan

New York: 44 Murray Street
Chicago: 471 Wrigley Building
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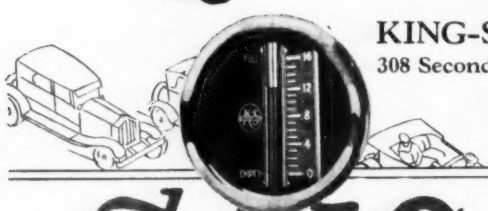

The K-S Telegage

BE CERTAIN WITH THE *K-S TELEGAGE*

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CORRECTION

In a compilation, by an oil association, of recent marketing company mergers, and published in NATIONAL PETROLEUM NEWS Nov. 20 issue, the statement on page 91 that Dixie Distributors, Inc. purchased the Parks-Klay Oil Co. was in error. Parks-Klay Co., Lima, Ohio, has purchased the Ebbling Supply Co.

Potential Mileage as Basis For Truck Replacement

CHICAGO

THE economic life of a truck used in the transportation of petroleum products may fairly accurately be estimated in miles on the basis of its maximum permissible chassis load, James C. Bennett, manager of the automotive department of the Associated Oil Co., told the group session on automotive transportation at the American Petroleum Institute meeting. Mr. Bennett discussed "A Basis for Retiring Automotive Equipment."

The potential life, according to a table presented by Mr. Bennett who based his conclusions on observations made in operating a fleet on the Pacific coast, runs from 40,000 miles for trucks having a maximum permissible chasis load of 1000 pounds and less, to 125,000 miles for trucks that have a permissible load of 7500 pounds and more.

"Thus far in the operation of the fleet which has formed the basis of this discussion," Mr. Bennett said, "it has appeared that in approximately seven years we may safely expect to have run the trucks to the limit of their economic operating expense, and, at the same time, to have reached the point where the advancements in design cannot be incorporated in the old trucks without unwarranted expenditure for capital account.

"There follows a presentation of the schedule of potential lives of the several classes of trucks and passenger cars which has been applied to the fleet, upon which this discussion is predicted. No claim is made that this particular schedule is appropriately applicable to all fleets. It may only be said that to date it has proved well suited to the fleet in question.

"It will be observed that the 'classes' of trucks are defined in terms of the 'maximum permissible gross load on chassis.' This has been developed after an exhaustive study of the limitations of frame, rear axle, tires, wheel base, and the various factors of the truck which have bearing on the question.

"No attempt is made to recognize makes of trucks or cars. There are instances where in a given class, it may be considered economical to purchase a cheaper truck or one that will probably give a shorter life—in miles—than is assigned to the class in which it falls. In such event, the potential mileage—and consequently the depreciation rate—is adjusted at the outset to conform to the expectancy of that particular piece of equipment. Thereafter there is no difference in the treatment accorded this truck or any other of the same class.

SCHEDULE OF POTENTIAL LIFE

Trucks

Class	Maximum Permissible Load on Chassis, In Pounds	Potential Life In Miles
0*	500	40,000
1**	1,000	40,000
2	2,500	80,000
3	4,000	80,000
4	5,500	90,000
5	7,500	125,000
6	9,000	125.000
7	11,000	125,000
8	14,000	125,000
9	22,000	125,000

*Light passenger car with box body.

**¾-ton truck and medium passenger car with box body.

Passenger Cars

Class	Potential Life, In Miles	Class	Potential Life, In Miles
1	40,000	4	90,000
2	60,000	5	110,000
3	80,000	6	120,000

"The adoption of any basis upon which to determine the replacement of automotive equipment is attended by the risk of dropping into the attitude that when a vehicle has run the mileage that was set up for it originally, it is ready for retirement regardless of its actual physical condition. This may lead easily to a blind policy of replacement, which may prove in the end to be extravagant, either because of too early replacement or because of replacement too long delayed.

"As a means of controlling this tendency in a thoroughly intelligent way, the rate of replacement may be checked constantly with the actual number of miles run by all vehicles in the several classes. By so doing, the owner will find himself enabled to take practically the fullest advantage of any improvements in his program of maintenance or upkeep, so that, should he find that he may safely extend the life in miles of any one or more vehicles, he may have a clear view of the effect on the general condition of the fleet as a whole.

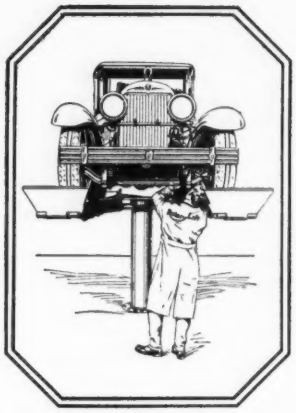
"The basis for such control is found by ignoring the investment in the fleet in terms of dollars and substituting the potential miles of the fleet as a whole. Having done this, then for each month there should be charged off the total number of miles run by the entire fleet. (This should be divided as between passenger cars and trucks, and periodically—perhaps semi-annually—the trucks should be sub-divided into their several classes.)

"If by now the owner has satisfied himself that the physical distribution of the units of the fleet is the most advantageous and economical that he can reasonably hope to make, his problem of replacement is reduced to that of purchasing new equipment at an average rate which exactly equals that at which the fleet is run. By so doing, he will be assured continuously that he is maintaining his investment in automotive equipment at the minimum consistent with its service. Further, he will be enabled to use this as a measuring stick in arriving at a decision to reduce or increase the number of vehicles.

* * *

"To illustrate the application of such a method of controlling retirements: Study of the condition of a fleet of some 1100 cars and trucks showed that on a Jan. 1 the sum of the potential lives of all units in the fleet amounted to approximately 35,000,000 miles. The rate of operation of the fleet, i.e., the rate of consump-

S. M. Cohn
Elected president of the Pennsylvania Oil Men's Association at the fall meeting in Pittsburgh, Oct. 15. Mr. Cohn is an officer in the Independent Oil Co., Altoona, Pa.



ROTARY LIFT PACKING GIVES A TRIPLE SERVICE

Packing around bearing surfaces in machinery is as old as machinery itself, because packing insures better lubrication of moving parts and avoids compression losses where pressure is utilized in operation. In Rotary Lift packing serves still another purpose—it prevents water from entering the lift around the piston, an important feature in cold climates, particularly where the lift is installed in the open. By thus preventing the accumulation of water in the lift, the packing in Rotary Lift provides protection against freezing that could not be secured otherwise.

When you install a Rotary Lift you know that in addition to the many advantages in its design and construction that the packing will insure smooth operation of the lift at all times; that no air pressure will be lost around the piston; and that the interior of the lift is fully protected against "leaks" from the outside regardless of the lift's location.

MEMPHIS
TENNESSEE

AUTOMOBILE ROTARY LIFT CO

Gott
Water Cans & Coolers
Gott
Built to last... you will always be assured of a fresh supply of pure water, when you have a GOTT Water Cooler. Order one now from your supply store.
Gotkool
GOTT Water Cans 1½ gal; 3 gal; 5 gal; and 10 gal.
GOTT Water Coolers 3 gal; 5 gal; 8 gal; 10 gal; and 20 gal.
H. P. GOTT MFG. CO. · Winfield, Kansas
KEEP PURE DRINKING WATER ALWAYS HANDY

tion, for the preceding year was 1,000,000 miles per month.

"The forecast for the following year indicated that the normal expansion would amount to 10 per cent. It appeared, then, that provision should be made for the purchase of 13,200,000 potential miles of new equipment during the succeeding year. This was divided between cars and trucks, and between the several subdivisions of each group as indicated by the distribution of the miles consumed during the preceding year. Unit costs for purchase were determined from former capital expenditures, and a budget prepared which admitted of forecasting the number of vehicles that would be required in the several subdivisions.

"During the year which followed, it was found that there were several vehicles whose physical condition made it necessary to abandon them at a lesser mileage than the original appraisal had indicated. (The fleet averaged some five or six years of age at the time that the mileage basis of depreciation was inaugurated.) Also, however, it was found that there were others whose potential life had been under-estimated.

"The net result was that the original forecast was demonstrated to have approximated very closely the correctness of the estimated life. As a matter of fact, in several instances, cars or trucks reached the point of failure during the time which elapsed between the presentation of recommendation for the funds and approval for expenditure."

Country Truck Drivers Buy From Bulk Plant

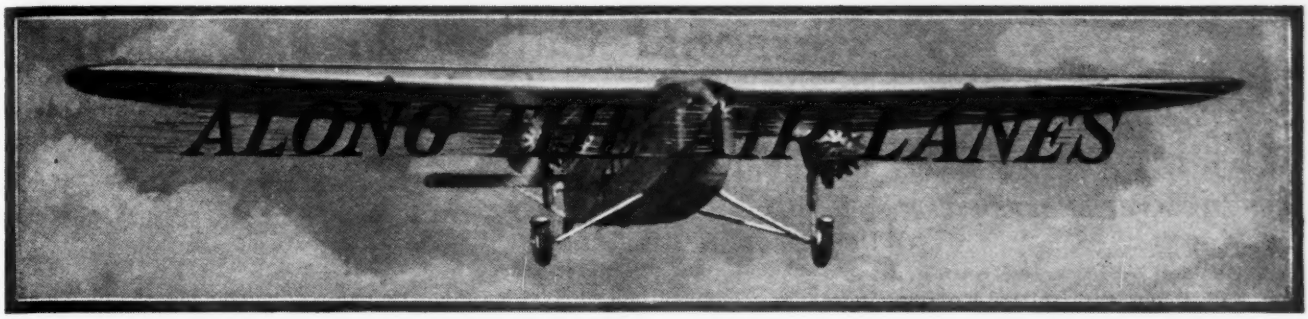
TERRE HAUTE, Ind.—Bookkeeping costs and credits on country tank truck routes of the Culley Oil Co. here have been pared by making the driver responsible for his sales. The company sells direct to the drivers, who in turn sell their goods to the farmers and roadside filling stations.

The bulk plant is operated by the driver of a truck delivering to the company's five service stations and to commercial and dealer accounts in Terre Haute. This truck is owned and operated by the company.

Two trucks cover the farm and roadside station routes. The trucks are owned and maintained by the drivers, but the company does the paint work.

Petroleum products are sold for cash to these two drivers. The office bookkeeping involves keeping a record of sales to the drivers—usually one load is taken each day.

The driver is selling his own goods to his customers and is solely responsible for credits. They have a margin to work on to pay their overhead and salary, the margin on gasoline is 1½ cents now.



THE latest transportation unit of the Standard Oil Co. of Louisiana, is a Keystone Loening amphibian "air yacht." It was originally purchased by the Standard Oil Development Co., subsidiary of the Standard of New Jersey, and later turned over to the Louisiana company. Two planes are now being used by the latter company, the other being a Buhl air sedan.

Powered with a Pratt & Whitney Hornet "A" No. 1 motor, this plane represents the last word in air equipment. Four swivel chairs, upholstered in red leather and spaced for comfort of passengers, constitute seating facilities. A walnut buffet and writing desk are on either side of the door leading to the pilot's cockpit. For conference purposes or for serving lunch, a folding table is carried along that can be fastened to the floor.

An amphibian type of plane was selected, as the bayous and swamps of Louisiana are not the best places to bring down a plane. A specially installed gasoline tank which brings the total gasoline carrying capacity up to 310 gallons, gives the plane a cruising radius of 700 miles. It will do 130 miles an hour at top speed and has a cruising speed of 100 miles per hour. Through a special arrangement photographs can be taken through the bottom of the hull.

This plane brought several Standard of New Jersey officials from New York City to the International Petroleum Exposition at Tulsa in October.

A significant feature of statistics recently published by the Aeronautics branch of the Department of Commerce, Washington, is that the oil industry, it can be assumed, was chiefly responsible for placing the Tulsa-Oklahoma City civil airway route into sixth place during 1928 for the number of passengers carried by airplane.

Sixth place was attained even though the route had operated but six months, while the four other routes exceeding this number of passengers operated the full 12 months. The Detroit-Chicago route, carrying 6412 passengers, was operated two months. On the Tulsa-Oklahoma City route 2695 passengers were carried by airplane by the Braniff lines.

The other routes carrying the greatest number of passengers were: Los Angeles-San Francisco, 11,118 passengers; St. Louis-Chicago, 5710 passengers; Los Angeles-Salt Lake, 5630; San Francisco-Portland 5081 passengers.

The number of miles flown between Tulsa and Oklahoma City totaled 104,000. The Chicago-New York route reported the highest number of miles with 2,092,602. San Francisco-Chicago was second with 1,817,809 miles; Los Angeles-Salt Lake City, third, with 950,552 miles.

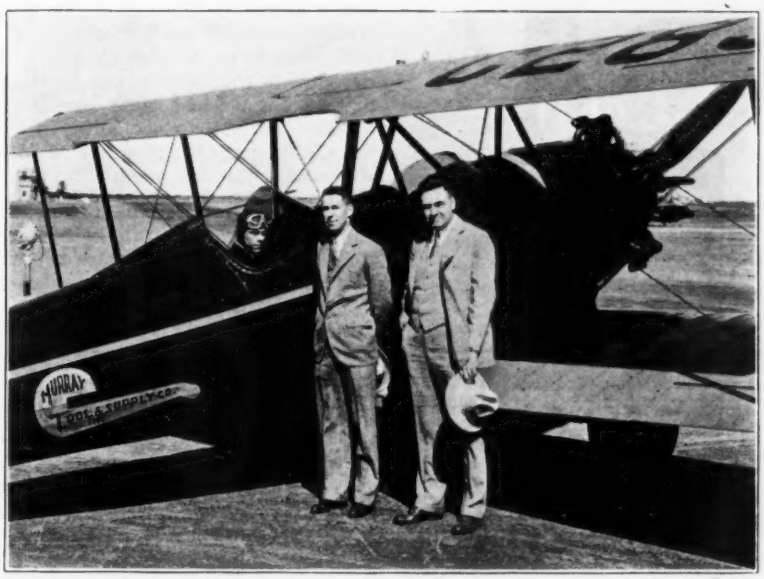
Truck-mounted aircraft refueling equipment has been adopted by the U. S. Army Air Corps, four units being recently bought from the Columbian Steel Tank Co., Kansas City.

The truck refueler and servicing crew can go down a line of planes with less trouble and danger than if the planes had to be taxied to any certain spot for fueling, an army officer believes who accepted delivery of the four refueling units from the Columbian company. He also said that there was a field for the underground refueling systems where only a few planes need servicing during a day.

Dudley M. Steele, flying manager of the aviation department of the Richfield Oil Co., Los Angeles, bemoans the fact that self-flying airplanes have not as yet been developed, because, he says, when this improvement is made, he will be able to cover lots more territory. He now spends at least two out of every 24 hours on the ground in an effort to snatch some much needed sleep.

Mr. Steele recently returned from a two weeks' trip to British Columbia where he flew to attend airport openings and in looking over the ground for future development. He also keeps the air lanes hot between his Los Angeles headquarters and the New York office.

An aerial advertising stunt has been developed by the Bleriot company, Paris, France, which consists of a large fabric panel towed behind a plane. When the plane takes off, the panel is rolled under the bottom wing in a specially designed paper packing, which packing is torn away permitting the panel to unroll at the desired altitude, according to a recent issue of Aviation.



Oklahoma's first oil field supply company to purchase an airplane for business purposes is the Murray Tool & Supply Co., Cleveland, Okla. The plane is a Spartan C-3-165, powered by a Wright "Whirlwind Five" motor, recently purchased from Spartan Aircraft Co., Tulsa. Left to right: Lee Hausinger, pilot; J. M. Murray, president of the Murray company and A. J. Johnson, secretary and treasurer

—N. P. N. Staff Photo

Imperial
GEARLESS PUMP
HIGH-BOYS
Positive Lever Action Operation

In the "Imperial HIGHBOY" embodying the new lever-operated, "dripless, gearless, griefless" pump, Bennett has again demonstrated what intensive specialization and scrupulous adherence to the highest quality standards can achieve. Here you have an all-metal pump that gives evidence of super-quality and super-service in every part.

Before you invest in new lube dispensing equipment investigate the 8 definite service superiorities of "Imperial HIGHBOYS". Obtainable in 30, 45 and 60 gallon sizes—respectively 10, 11½ and 13 inches wide with one or two-way dispensing nozzles

SERVICE STATION EQUIPMENT CO. LTD., TORONTO 2, CANADA

BENNETT EXPORT CORP., 32 BROADWAY, NEW YORK

"IMPERIAL" Pump
Piston Construction

No gears — lever action operation—all metal—construction like a fine automobile engine cylinder.

"IMPERIAL" Pump
Nozzle Construction

Positive non-drip shut-off nozzle operates at the touch of a finger.

Write for HIGHBOY Bulletins!

"Symbol of Quality"

Bennett Pumps Corporation
QUALITY BUILT
Bennett
Dispensing Equipment
FOR OIL MARKETERS
Muskegon, Michigan.

Personal Calls, Once a Month, Effective Sales Builders

CLEVELAND

PERSONAL solicitation on large accounts has been effective in building business for several small dealers in Ohio. These dealers have found it advisable to see their customers about once a month. The truck drivers and those running salesmen's cars know the men at the service station, but these dealers keep in touch with the man higher up—the man who decides where the gasoline and oil shall be purchased.

Getting around to customers once a month is the policy of A. H. Diringer, operating two service stations at Tiffin, Ohio. During the first days of each month he spends most of his time collecting, and calling on his buyer customers.

"My men and I know the drivers but we want to keep in touch with the big fellow," said Mr. Diringer. "If you don't keep in touch with him he'll throw his business to some oil man who does, figuring that you are not interested in getting his business."

Twice a year he sends out direct mail literature to all customers telling about the service at his two stations as a means of impressing his customers that he is interested in their patronage. Small gifts are sent to regular customers at Christmas time.

Newspaper advertising is used in selling also. The annual appropriation is about $250 to $275, not including cost of such items as special ads, donations, or charity gifts. When net profits are determined at the close of the year he takes about some amount to be used in advertising for the following 12 months; a definite percentage is not used.

To go after the small business of the one or two-car family he is planning a house-to-house canvass by his station attendants during January and February. Each day one man from a station is to make calls in his neighborhood. This time of the year has been selected as it is the dullest from volume of sales stand point.

All homes within half a mile radius of each station are scheduled for a personal call from the attendants. Hand bills or some piece of literature is being planned to leave at the homes. Following the house-to-house canvass direct mail letters will be sent to all automobile owners in the city in order to reach those not called upon.

Diversified lines of merchandise on sale at stations is a hindrance in selling, Mr. Diringer believes. He has found it advisable to be around his station at frequent intervals. Customers will remark that they have not seen him around the station the last several times they have been in and banter about his not being on the job. He believes in staying around the station to keep customers from thinking he is too important to be at his "gas" station.

Time is needed to get out on the street and sell his goods, he said, and too many lines requires too much time away from the station. Mr. Diringer has an auto wash as an extra service, believing this is more profitable than tires or batteries.

Charles O. Hubbs, oldest Independent oil man in Mansfield, Ohio, has found personal contact profitable also. He opened up a curb pump 15 years ago and his first service station eight years ago was the second drive-in station in Mansfield. This past summer sales have increased at his station in spite of new stations opening on opposite corners. This increase he attributes to personal contacts and friendships.

For the big accounts he likes to get around every 30 days. A campaign on the small customers, to reach him every 30 to 60 days, is being planned with post cards carrying an advertisement of a seasonal nature. This merchandise plan was used several years ago with success, then dropped, and now Mr. Hubbs is planning to revive the campaign.

Advertising novelties, such as booklet matches and lead pencils, have taken well with his customers.

Radio Programs Enlarged

TULSA, Dec. 5.—The Mid-Continent Petroleum Corp. this week inaugurated a new radio broadcasting schedule which will include the presentation of the "Diamond Oilers" five nights each week instead of only one night as has been the case since the corporation started its radio advertising in October over the N.B.C. chain.

Six stations in the middle west will be used for the broadcasts—KVOO, Tulsa; KMOX, St. Louis; WDAF, Kansas City; WHAS, Louisville; WHO, Des Moines, and WOC, Davenport, Ia.

The Diamond Oilers will be heard over KVOO each Monday evening between 7:30 and 8 o'clock; over KMOX each Tuesday evening between 7 and 7:30 o'clock; over WDAF each Thursday evening between 6:30 and 7 o'clock; over WOC each Friday evening between 6:30 and 7 o'clock and over WHAS between 7 and 7:30 and over WHO between 6:30 and 7 o'clock each Saturday evening.

Oil Trademarks For Copyright

The following are trademark applications pertinent to our field pending in the United States Patent office which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Mark Company, Barrister Building, Washington, D. C. trade-mark specialists.

As an additional service feature to its readers, this journal gladly offers to them an advance search free of charge on any mark they may contemplate adopting or registering. You may communicate with the Editor of this Department, or send your inquiry direct to the National Trade-Mark Company, stating that you are a reader of this journal.

"LAST-A-LONG" No. 288,492. Columbia Oil Company, St. Louis, Mo. For lubricating oils.

"ROCKET" No. 289,295. Sinclair Refining Co., New York City. For lubricating oils.

"RAPIER" No. 289,296. Sinclair Refining Co., New York City. For lubricating oils.

"MAGNOLIA" No. 274,351. Magnolia Petroleum Co., Dallas, Tex. For petroleum products with or without admixtures of other materials for heating, power, burning, etc.

"RINGREX" No. 277,820. Standard Oil Co. of New York, New York City. For petroleum products.

"TAILWIND" No. 288,300. Independent Oil and Gas Co., Tulsa, Okla. For gasoline and lubricating oils.

"CASTOR BLENDED" No. 287,421. Pennant Oil & Grease Co., Inc., Los Angeles, Calif. For lubricating oils and greases.

"PETRYL" No. 288,353. Carl M. Page, Evanston, Ill. For lubricating oil compound.

"JADE" No. 288,668. Sinclair Refining Co., New York City. For lubricating oils.

"SUPERLITE" No. 288,826. Western Oil & Refining Co., Los Angeles, Calif. For kerosene.

"CALRECO" No. 289,145. Calumet Refining Co., Chicago, Ill. For lubricating oils.

"OLD GOLD" No. 289,224. Ashland Refining Co., Ashland, Ky. For lubricating oils and greases and gasoline.

"Ben Franklin" No. 285,912. The Franklin Railway Oil Co., Franklin, Pa. For lubricating oils and greases.

"XLCR" No. 282,648. The Great Western Oil Co., Cleveland, Ohio. For gasoline.

"SEABOARD" No. 272,623. Seaboard Petroleum Corp., Los Angeles, Calif. For gasoline, kerosene, fuel oil, etc.

"BURNING BEAUTY" No. 286,158. Crystal City Fuel & Oil Co., Inc., Crystal City, Mo. For gasoline, kerosene, fuel oil, etc.

"PAN-AM" No. 287,884. Pan American Petroleum & Transport Co., Wilmington, Del. For gasoline, lubricating oils and greases.

"STURDY AND RICH" No. 288,932. Standard Oil Co., Whiting, Ind. For lubricating oil.

"GAS-LUBE" No. 290,153. L. Sonneborn Sons, Inc., New York City. For lubricating oils.

"ALEMITE GAT" No. 271,421. The Bassick Manufacturing Co., now by change of name to Alemite Corp., Chicago, Ill. For apparatus for applying and dispensing lubricant namely grease guns and parts thereof.

"THERE'S AN EXTRA QUART IN EVERY GALLON" No. 290,087. Quaker State Oil Refining Co., Oil City, Pa. For lubricating oils and greases.

"FLAMO' No. 290,801. Standard Oil Co. of California, Wilmington, Del., and San Francisco, Calif. For gasoline for illuminating purposes, gasoline for fuel purposes, gasoline for heating purposes.

"CAT-TRAC" No. 273,033. Elmer D. Van Roo, doing business as Penn Oil Products Co., Milwaukee, Wis. For lubricants having an oil base.

"DUROIL" No. 283,188. The Franklin Oil & Gas Co., Bedford, O. For lubricating oil.

They Win In Winter

TRADE MARK

FISKE'S

GEAR LUBRICANTS

Whatever the degree of frost, the consumer can always expect smooth, even, quieting lubrication from Fiske's Gear Lubricants.

The Jobber in handling them can expect smooth, even, quieting peace of mind for these lubricants merit complete confidence.

Selling Fiske's products under their own brands has become a profitable habit with many jobbers. Our attractive packages include all regular sizes. All of our steel drums - full, half and quarter, are new.

Samples and prices sent upon request

ESTABLISHED 1870

FISKE BROTHERS REFINING CO.

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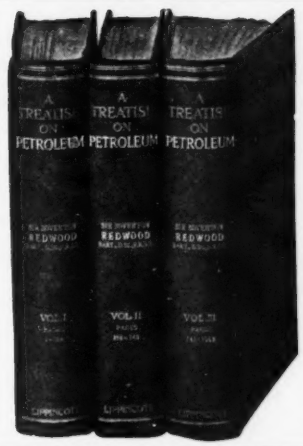

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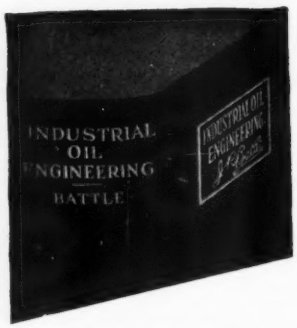

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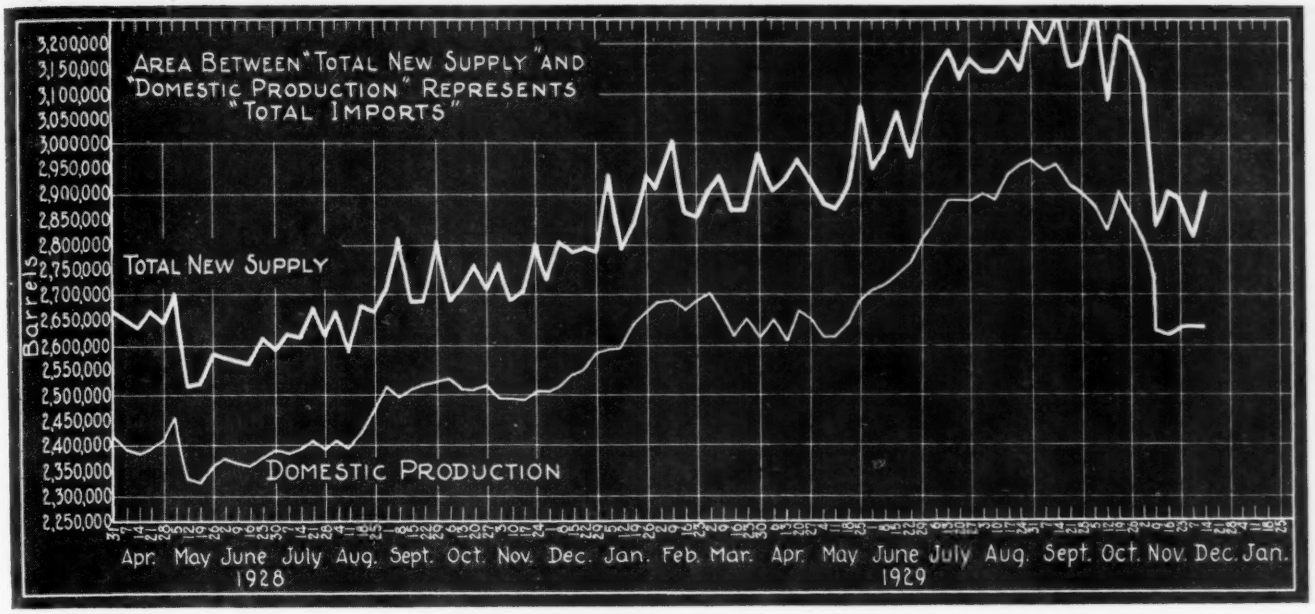
Daily Average Crude Oil Production and Imports



Daily average gross output of United States, by fields, for week ending with dates below as compiled by American Petroleum Institute

PRODUCTION SUMMARY

	Dec. 7	Nov. 30
Production east of Rockies	**1,931,850**	**1,933,700**
Decrease		**1,850**
Total production in U. S.	**2,630,550**	**2,638,200**
Decrease		**7,650**
Crude oil imports	**277,571**	**181,714**
Increase		**95,857**
Total crude supply	**2,908,121**	**2,819,914**
Increase		**88,207**

OKLAHOMA

	Dec. 7	Nov. 30
Allen Dome	21,050	21,400
Asher	3,950	4,200
Blackwell	3,700	3,750
Bowlegs	23,650	25,700
Braman	3,700	3,700
Bristow-Slick	18,650	18,700
Burbank	17,600	17,500
Carr City	10,850	9,550
Cromwell	7,600	7,600
Cushing	15,700	15,700
Davenport	1,300	1,300
Duncan District	8,450	8,450
Earlsboro	66,750	73,550
East Seminole	4,950	4,950
Fox	1,300	1,300
Garber	4,850	4,900
Graham	3,900	3,900
Healdton	12,650	12,650
Hewitt	7,850	7,850
Hubbard	1,700	1,700
Little River	69,200	70,100
Logan County	13,800	14,700
Maud	8,200	8,350
Mission	15,150	14,500
North Okmulgee	11,300	11,300
Oklahoma City	72,550	55,700
Osage (outside Burbank)	26,750	26,700
Papoose	3,200	3,200
Pearson	850	850
St. Louis	54,050	53,000
Sasakwa	8,250	11,100
Scholem-Alechem	13,800	13,800
Searight	9,100	9,350
Seminole	25,400	24,200
South Okmulgee	7,100	7,050
Thomas	650	650
Tonkawa	8,800	8,800
Wewoka	4,300	4,350
Yale-Jennings	7,350	7,300
Others	55,150	55,550
Total, Oklahoma	655,100	648,900
Increase		6,200

Kansas

Augusta-Fox Bush	3,000	3,000
Churchill	5,150	5,350
El Dorado-Towanda	12,900	12,900
Florence-Covert	1,050	1,050
Greenwood County	21,700	21,500
Oxford	3,400	3,400
Peabody-Elbing	3,150	3,150
Rainbow Bend	1,150	1,150
Russell	3,400	3,200
Sedgwick County	23,050	22,900
Others	31,800	32,200
Total, Kansas	109,750	109,800
Decrease		50

NORTH LOUISIANA

Bellevue	600	650
Caddo, light	10,600	10,250
Caddo, heavy	2,850	2,950
Cotton Valley	2,500	2,500
De Soto and Red River	3,000	3,000
Elm Grove	550	550
Haynesville	4,800	4,800
Homer	3,700	3,750
Pleasant Hill	750	800
Urania	5,500	5,500
Zwolle	3,100	2,000
Others	650	650
Total, North Louisiana	38,600	37,400
Increase		1,200

ARKANSAS

Champagnolle	5,650	5,250
El Dorado	4,300	4,300
Lisbon	1,150	1,150
Nevada	1,050	1,050
Smackover, light	5,800	5,800
Smackover, heavy	43,750	44,350
Stephens	1,000	1,000
Others	100	100
Total, Arkansas	62,800	63,000
Decrease		200

TEXAS (Outside Gulf Coast)

Panhandle District

	Dec. 7	Nov. 30
Carson County	9,850	10,100
Gray County	61,500	62,200
Hutchinson County	27,800	27,500
Wheeler County	800	800
Others	800	700
Total, Panhandle Texas	100,750	101,300
Decrease		550

North Texas

Archer County	18,550	18,300
Burkburnett	9,550	9,500
Electra	11,700	11,650
Iowa Park and K. M. A.	4,850	4,800
Montague-Cooke	14,700	14,900
Wilbarger	30,000	29,500
Others	900	900
Total, North Texas	90,250	89,550
Increase		700

West Central Texas

	Dec. 7	Nov. 30
Brown County	10,400	10,500
Callahan County	3,350	3,400
Coleman County	6,400	6,500
Eastland-Desdemona	6,400	6,500
Jack County	3,850	3,700
Palo Pinto County	500	550
Shackleford County	9,400	9,500
Stephens County	6,400	6,300
Throckmorton County	600*	600
Young County	7,350	7,300
Others	1,400	1,500
Total, West Central Texas	56,050	56,350
Decrease		300

West Texas

	Dec. 7	Nov. 30
Crane and Upton Counties	45,150	44,350
Crockett County	2,000	2,100
Howard County	40,400	41,700
Jones County	2,500	2,550
Mitchell and Scurry Counties	2,450	2,500
Pecos County	142,300	144,550
Reagan County	16,950	17,300
Winkler County	95,400	99,050
Others	3,200	2,950
Total, West Texas	350,350	357,050
Decrease		6,700

East Central Texas

Boggy Creek	3,900	3,400
Corsicana-Powell	6,850	6,800
Currie	400	400
Mexia	5,150	5,000
Nigger Creek	300	350
Richland	300	300
Van Zandt County	400	300
Wortham	950	1,000
Total, East Central Texas	18,250	17,550
Increase		700

Southwest Texas

Dale	350	350
Laredo District	9,350	9,100
Luling	10,700	10,800
Lytton Springs	900	900
Refugio County	15,450	16,000
Salt Flat	31,300	32,200
Somerset	1,700	1,600
Others	2,350	2,000
Total, Southwest Texas	72,100	72,950
Decrease		850
Total, Texas (Outside Gulf Coast)	687,750	694,750
Decrease		7,000

GULF COAST

Coastal Texas

Barbers Hill	18,700	21,050
Batson	1,350	1,300
Big Creek	3,600	3,950
Blue Ridge	2,450	2,700
Boling	1,250	1,300
Damon Mound	500	500
Fannett	1,600	1,600
Goose Creek	5,400	5,400
Hull	10,950	10,050
Humble	16,100	16,400
Orange County	3,050	3,200
Pierce Junction	11,400	11,250
Raccoon Bend	9,250	9,100
Saratoga	1,000	950
Somerville	1,500	1,600
Sour Lake	2,500	2,550
South Liberty	5,600	5,650
Spindletop	19,350	19,800
Sugarland	12,200	11,700
West Columbia	6,850	6,400
Others	6,200	5,950
Total, Coastal Texas	140,800	142,400
Decrease		1,600

Coastal Louisiana

East Hackberry	1,650	1,950
Edgerly	600	650
Evangeline	1,600	1,500
Lockport	3,550	3,700
Old Hackberry	2,100	2,800
Sorrento Dome	150	50
Sulphur Dome	7,000	6,200
Vinton	4,350	4,500
Others	3,050	2,200
Total, Coastal Louisiana	24,050	23,550
Increase		500
Total Gulf Coast	164,850	165,950
Decrease		1,100

ROCKY MOUNTAIN

Wyoming

Big Muddy	2,100	2,100
Elk Basin	700	650
Grass Creek	2,100	2,150
Labarge	2,250	2,050
Lance Creek	150	150
Lost Soldier	3,400	3,150
Oregon Basin	4,300	4,550
Rock Creek	2,300	2,250
Salt Creek	28,950	33,050
Others	4,650	4,650
Total, Wyoming	50,900	54,750
Decrease		3,850

Montana

Cat Creek	1,200	1,250
Pondera	2,400	2,450
Sunburst	6,800	6,800
Others	100	50
Total, Montana	10,500	10,550
Decrease		50

Colorado

Florence	650	900
Fort Collins	1,850	1,850
Moffat (Craig)	1,050	1,200
Others	1,700	1,700
Total, Colorado	5,250	5,650
Decrease		400

New Mexico

Artesia	850	850
Balance Lea & Eddy Counties	4,350	4,050
Hogback	400	400
Rattlesnake	1,500	1,650
Table Mesa	100	100
Others	750	400
Total, New Mexico	7,950	7,450
Increase		500
Total, Rocky Mountain	74,600	78,400
Decrease		3,800

CALIFORNIA

Dominguez	8,500	8,500
Elwood-Goleta	33,000	38,000
Huntington Beach	42,000	42,000
Inglewood	23,000	23,000
Kettleman Hills	10,000	10,000
Long Beach	105,000	106,000
Midway-Sunset	73,500	72,500
Santa Fe Springs	167,500	160,000
Seal Beach	30,000	30,000
Ventura Avenue	51,700	60,000
Others	154,500	154,500
Total, California	698,700	704,500
Decrease		5,800

EASTERN

(Not including Michigan)	122,100	120,000
Increase		2,100

MICHIGAN

Mt. Pleasant	8,550	7,750
Muskegon	7,500	7,500
Saginaw	250	250
Total, Michigan	16,300	15,500
Increase		800

Compilation Of Mid-Continent Refinery Operations

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Mid-Continent Refinery Operations Week Ended December 6 (By Telegraph)

	Kansas	Oklahoma	North & Cent. Texas	West Texas	North La.-Ark.	Total Ended	Week Dec. 6
Plants Reporting	12	29	25	15	12	93	
Da. Av. Cap. (Bbls.)	92,000	160,200	86,600	81,500	54,900	475,200	
Da. Cracking Capacity	30,700	52,600	17,200	5,000	22,700	128,200	
Da. Av. Crude Runs	54,224 — 5.0	108,794 — 0.8	61,448 — 2.6	28,951 — 5.1	57,494 + 5.1	310,911 — 1.3	
Da. Av. Other Oils	7,901 + 31.1	5,030 — 8.2	2,427 + 62.4	2,469 + 7.6	1,622 — 41.1	19,449 + 7.7	
GASOLINE—Gallons							
Stocks, Nov. 29	17,113,000	50,650,000	16,457,000	12,478,000	8,307,000	105,005,000	
Prod. 11-29 to 12-6	9,481,000 + 7.7	17,172,000 — 4.1	8,116,000 — 7.9	3,163,000 + 1.9	5,411,000 + 4.6	43,343,000 — 1.0	
Ship. 11-29 to 12-6	8,678,000 + 6.3	18,065,000 + 16.0	7,674,000 — 7.7	3,461,000 + 18.6	4,733,000 + 3.4	42,611,000 + 7.7	
Stocks, Dec. 6	17,916,000 + 4.7	49,757,000 — 1.8	16,899,000 + 2.7	12,180,000 — 2.4	8,985,000 + 8.2	105,737,000 + 0.7	
Ratio Sales to Prod.	91.5%	105.2%	94.6%	109.4%	87.5%	98.3%	
KEROSENE—Gallons							
Stocks, Nov. 29	14,156,000	8,458,000	2,345,000	31,000	1,424,000	26,414,000	
Prod. 11-29 to 12-6	1,853,000 + 6.1	1,916,000 — 15.3	1,525,000 — 12.8	33,000	430,000 + 7.2	5,757,000 — 6.5	
Ship. 11-29 to 12-6	1,397,000 + 20.2	2,089,000 — 5.9	1,734,000 + 0.1	23,000	414,000 + 38.0	5,657,000 + 4.5	
Stocks, Dec. 6	14,612,000 + 3.2	8,285,000 — 2.0	2,136,000 — 8.9	41,000 + 32.3	1,440,000 + 1.1	26,514,000 + 0.4	
Ratio Sales to Prod.	75.4%	109.0%	113.7%	69.7%	96.3%	101.8%	
STOVE DISTILLATE—Gallons							
Stocks, Nov. 29	2,784,000	5,449,000	1,453,000	287,000	89,000	10,062,000	
Prod. 11-29 to 12-6	382,000 — 31.0	1,072,000 + 5.9	428,000 + 27.0	93,000 — 6.1	212,000 + 27.7	2,187,000 + 0.9	
Ship. 11-29 to 12-6	571,000 + 9.2	1,668,000 + 38.1	401,000 — 22.6	193,000 +382.5	159,000 — 60.6	2,992,000 + 11.1	
Stocks, Dec. 6	2,595,000 — 6.8	4,853,000 — 10.9	1,480,000 + 1.9	187,000 — 34.8	142,000 + 59.6	9,257,000 — 8.0	
Ratio Sales to Prod.	149.4%	155.5%	93.7%	207.5%	75.0%	136.8%	
GAS OIL—Gallons							
Stocks, Nov. 29	3,207,000	39,283,000	2,438,000	11,021,000	4,628,000	60,579,000	
Prod. 11-29 to 12-6	1,375,000 + 7.5	3,907,000 + 72.6	692,000 — 4.7	817,000	2,327,000 + 1.2	9,118,000 + 54.0	
Ship. 11-29 to 12-6	1,583,000 +102.4	4,649,000 +174.6	307,000 — 44.4	800,000 — 17.8	2,844,000 — 4.7	10,183,000 + 45.8	
Stocks, Dec. 6	3,001,000 — 6.5	38,541,000 — 1.9	2,823,000 + 15.8	11,038,000 + 0.2	4,111,000 — 11.2	59,514,000 — 1.8	
Ratio Sales to Prod.	115.1%	119.0%	44.4%	97.9%	122.2%	111.7%	
FUEL OIL—Gallons							
Stocks, Nov. 29	13,232,000	38,378,000	68,707,000	24,989,000	21,586,000	166,892,000	
Prod. 11-29 to 12-6	4,364,000 — 11.9	5,654,000 — 10.9	7,719,000 — 0.3	3,483,000 — 23.0	5,524,000 — 0.3	26,744,000 — 8.1	
Ship. 11-29 to 12-6	5,301,000 + 5.7	8,545,000 + 2.8	8,903,000 + 21.6	5,360,000 — 9.6	5,416,000 — 8.5	33,525,000 + 3.2	
Stocks, Dec. 6	12,295,000 — 7.1	35,487,000 — 7.5	67,523,000 — 1.7	23,112,000 — 7.5	21,694,000 + 0.5	160,111,000 — 4.1	
Ratio Sales to Prod.	121.4%	151.1%	115.3%	153.9%	98.0%	125.4%	

Gasoline Produced by Various Methods, Week Ended December 6

	Kansas	% of Total	Oklahoma	% of Total	North & Cent. Texas	% of Total	West Texas	% of Total	Louisiana-Arkansas	% of Total	Total	% of Total
Straight Run	5,835,000	61.5	11,456,000	66.7	5,677,000	69.9	2,920,000	92.3	1,999,000	36.9	27,887,000	64.3
Cracked	2,874,000	30.3	4,702,000	27.4	1,368,000	16.9	103,000	3.3	2,746,000	50.9	11,793,000	27.2
Natural	772,000	8.2	1,014,000	5.9	1,071,000	13.2	140,000	4.4	666,000	12.2	3,663,000	8.5
Total	9,481,000		17,172,000		8,116,000		3,163,000		5,411,000		43,343,000	

+ or — columns are % change over previous week

Stocks Except Gasoline Lowered at 93 Plants

Staff Special—By Telegraph
TULSA, Dec. 10

STOCKS of all major commodities except gasoline were reduced at 93 Mid-Continent refineries in the week ended Dec. 6. Gasoline stocks increased 700,000 gallons.

Crude runs were reduced 14,000 barrels daily average with each district sharing in reduction except Louisiana-Arkansas where runs were increased 2700 barrels daily average.

Gasoline production was 400,000 gallons lower than in the last week of November. Gasoline shipments were higher than in the preceding week by 3,000,000 gallons. Oklahoma and West Texas refiners drew on stocks. In Oklahoma the reduction was due to both curtailed output and an increase of 2,500,000 gallons in shipments. West Texas production

Summary for the Month

Production and shipments, all reporting refineries, for four weeks ended Dec. 6. Change in stocks figures from Nov. 8.

	Gallons
GASOLINE	
Production	182,312,000
Shipments	172,150,000
Net change in stocks	+10,162,000
Ratio sales to production	94.4%
KEROSENE	
Production	25,401,000
Shipments	21,592,000
Net change in stocks	+3,809,000
Ratio sales to production	65.0%
STOVE DISTILLATE	
Production	8,758,000
Shipments	10,232,000
Net change in stocks	—1,474,000
Ratio sales to production	116.8%
GAS OIL	
Production	28,638,000
Shipments	34,768,000
Net change in stocks	—6,130,000
Ratio sales to production	121.4%
FUEL OIL	
Production	122,416,000
Shipments	135,440,000
Net change in stocks	—13,024,000
Ratio sales to production	110.6%

was steady with shipments 500,000 gallons larger.

Lower kerosene production with slight increase in shipments caused draft on stocks of 100,000 gallons. Distillate production was steady and shipments slightly higher. Gas oil production increased 3,000,000 gallons and shipments a like amount. Stocks were reduced 1,000,000 gallons.

Fuel oil stocks were reduced 6,700,000 gallons.

Time Payments Expected To Aid Auto Sales

PHILADELPHIA, Dec. 5.—Installment selling, with the financing of automobile purchases on the time payment plan as its largest single item, is one of the factors expected to come to the rescue in the present business depression, Automotive Industries said last week. Many of those hit by the stock market, it is explained, now will buy on installments instead of paying cash, which should assure, if not stimulate, volume sales of automobiles in 1930.

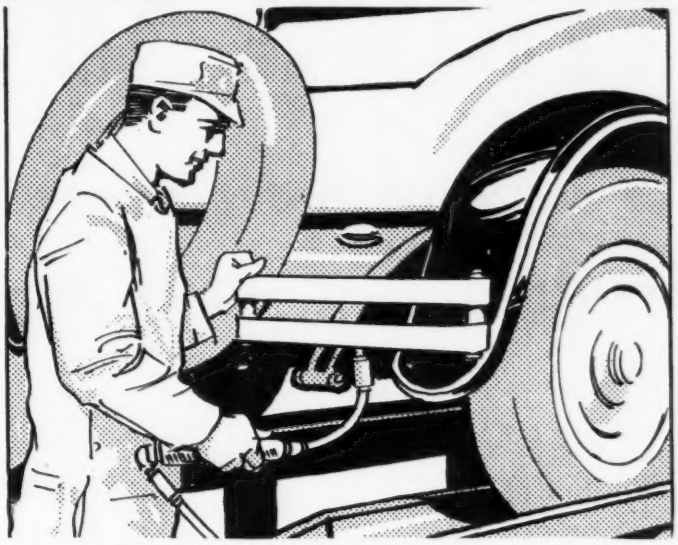
Importance of this factor in the situation may be increased in 1930 if finance company paper is made eligible for rediscount at Federal Reserve Banks, the publication says. An organized effort to make this paper eligible just has been undertaken by the National Association of Finance Companies. To accomplish the desired result, either Congress must amend the Federal Reserve Act or the Federal Reserve Board must change its regulations.

The latter action is favored by members of the association as being the simplest and quickest method of making the paper more readily convertible. Eligibility of their paper would, it is conceded, make it easier for finance companies to extend their lines of credit and to obtain additional lines at banks, and thus enable them to finance more installment sales.

With many automobile plants shut down for inventory and a number of others devoting a large part of their attention toward getting new models into production, it is doubtful if the total passenger car and truck production for the United States and Canada this month will equal that of November, 1928, when 268,909 passenger cars and trucks were turned out.

WASHINGTON—The Market Data Handbook of the United States, compiled by the Domestic Commerce Division of the Department of Commerce, is being issued early in December. Much of the data is available for the first time in this 535-page book. Three general types of markets are considered, the general consumer, the farm and the industrial market.

Price of the book is $2.50 and it may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C.



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The caveman worked alone . . .

it was not until human beings gathered into families, clans and tribes that the world began to go forward.

And, in these modern days, it is still a hard task for the man who works alone to build anything. If you carry nationally advertised gasoline and motor oil, you are not working alone—your burden is lighter—you belong to a great business group—you have the selling help of a widely known organization—the dealers in other states display the same signs you do and their customers touring the country are more likely to drive into your station because your signs give them confidence. National advertising links Sinclair dealers—helps one create business for the other—helps them all build good will with good oils and good service.

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OPALINE

REG. U.S. PAT. OFF.

is **NATIONALLY ADVERTISED AS THE** *Extra Service* **MOTOR OIL**

Light Oils Quiet in Mid-Continent; Burning Oils More Active

Staff Special
TULSA, Dec. 7.

HIGHER gravity gasolines came to the front in the Mid-Continent refinery market the first week of December, but generally speaking all gasolines were in comparatively light demand. No export buying was reported. Prices for the higher gravities advanced slightly while those for the low gravity grades lost some ground.

Natural gasolines were moved mostly on contract, little spot demand developing during the week. Prices for some grades were fractionally lower.

Kerosenes generally were inactive. Distillates increased in demand due to the colder weather. Gas oils were comparatively active, especially the zero grades. Fuel oils were active in all districts with price advances recorded on some grades.

Neutral oils were advanced from 0.50 to 1 cent a gallon by several refiners with reports that stocks had been reduced recently and demand had increased. Bright stocks were steady in price and demand. Wax was quiet.

Gasolines

The weather undoubtedly was having its effect on the gasoline market. Orders were comparatively small and several refiners reported contract movement had slowed up considerably. The higher gravity gasolines were the most active of the list.

Inquiries were reported good in several quarters for the 60-62, 400 e.p., 64-66, 375 e.p. and the 68-70, 350-360 e.p. grades, and prices advanced slightly in some districts. No change was noted generally in the price range for 58-60 U. S. Motor, but the lower gravity gasolines lost some ground with demand exceptionally light. One refiner reported late in the week that he had ceased to make 58-60, 450 e.p. gasoline.

No export inquiries were reported in the field. A few refiners were anticipating some new buying, however, before the end of the month. Most of the gasoline bought several weeks ago was to have been shipped by the first of the year, and the refiners in north Texas particularly are watching export developments closely in anticipation of new business.

Neutral Oils and Bright Stocks

Several Oklahoma refiners advanced prices for neutral oils. One company advanced prices for all grades above 200 No. 3 color neutral oil 1 cent a gallon, and all grades below that one, 0.5 cent a gallon. The advance was met by several other refiners.

The advance was reported to have been due primarily to a lowering of production and an increase in demand which has pulled fairly large quantities of neutral oils out of storage the past few weeks.

Bright stocks also were advanced by a few refiners but stocks of these oils have been comparatively low for some time with demand good. The advance kept the prices generally within the range of the previous week.

Natural Gasolines

Demand for natural gasolines was light throughout the week. The only buying of consequence was a 50 car order of grade AA at 6.50 cents, and several orders for special naturals. One of the export sales reported previously is to be lifted at the Gulf Dec. 20, and another cargo is to be loaded in January.

Several reports were heard of distress goods appearing in the market, but one large buyer with ample storage offered to buy at least a portion of these goods. What quantity he bought, however, was not revealed.

Grade AA at the close of the week was 6.50 cents a gallon while grade A was slightly higher. Grades B, BB and C remained together in price, selling mostly at 6 to 6.125 cents a gallon.

Kerosenes

Kerosenes were featureless in all districts. An export inquiry was reported in north Texas but no sales were checked. Several Arkansas and Louisiana refiners have started making a 44-46 gravity kerosene in view of the good demand in past winters for this grade from export buyers.

Fuel Oils

All districts of the Mid-Continent enjoyed a good demand for fuel oils. Refiners in some districts reported railroads and industrial users were ordering more goods on their contracts.

Several sellers active in fuel markets were of the opinion the heaviest demand was just beginning, and with any degree of cold weather through the next two months fuel oil prices would be given considerable strength.

A number of refiners reported a growing tendency on the part of buyers to specify viscosity and cold test more than gravity, while in some instances the buyers would leave the matter of gravity to the judgment of the refiners. For example, a number of cars of 14-16 gravity, zero cold test oil was moved this week at $0.75 a barrel, while some 18-22 gravity, 30 cold test oil, was sold at $0.70.

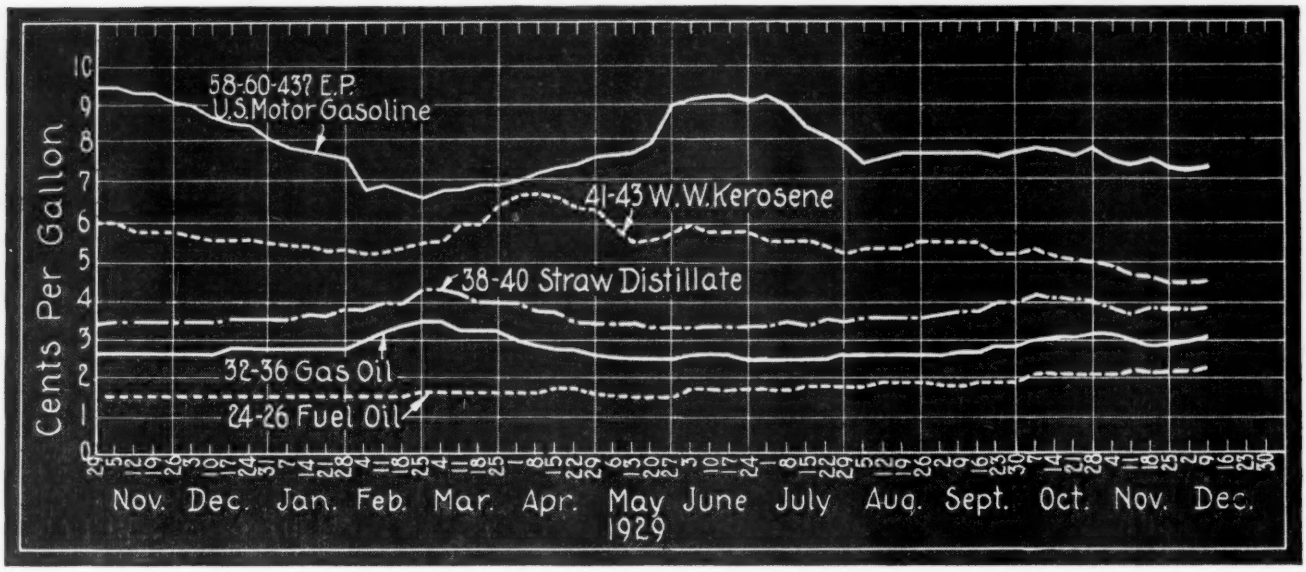
Distillates and Gas Oil

Distillates continued to gain momentum but a majority of refiners reported the general demand had not been sufficient to clear more than the weak spots in the market.

Refiners who were well contracted and had very little goods to offer in the spot market continued to quote 4 cents a gallon for 38-40 straw distillate, while others who were depending mostly on the spot market to move their production were asking from 3.75 to 4 cents a gallon.

Curtailment of cracking operations by several refiners was reflected in the increased offerings of uncracked gas oil. Cracked gas oil with a low cold test was in greater demand and with goods somewhat scarcer, prices advanced 0.125 cent a gallon.

Current Prices of Principal Mid-Continent Refined Products



Prices shown are in Group 3 basis and extended to date shown in Refinery Market Tables Section of this issue

Lemont Refinery Contracts For Mid-Continent Oil

CHICAGO, Dec. 5.—The article in the Nov. 20 issue of NATIONAL PETROLEUM NEWS describing the Lemont, Ill., refinery of the Globe Oil & Refining Co. stated that the plant was running on crude from the Muskegon field of Michigan.

This statement was correct at the time the article was written. G. G. Woodruff, of the Globe company, points out, however, that the company has recently made arrangements to receive 5000 barrels of high grade Mid-Continent crude through the new Texas-Empire pipe line because of the greater attractiveness of that crude in the company's refining operations. Work on an extension of the pipe line from Lockport, Ill., to Lemont is practically complete and deliveries of crude are to start in the near future, Mr. Woodruff states.

The plant at Lemont was taken over by the Globe interests last June and extensive additions and improvements have been made, so the plant is now a modern refinery capable of running 10,000 barrels daily.

CHICAGO, Dec. 7.—The J. J. and M. Taxman Refining Co.'s plant at Wichita Falls, Texas has resumed operations and is running about 2500 barrels daily. Practically all of their production is being applied on export orders.

Tide Water Orders Two Tankers

NEW YORK, Dec. 6.—Two deep-draft sea-going tankers of approximately 13,500 deadweight tons each, will be built for the Tide Water-Associated Transport Corp. by the Sun Shipbuilding & Dry Dock Co. Crude carrying capacity of each vessel will be about 100,000 barrels, and gasoline capacity 115,000 barrels. The vessels will carry a crew of 36 men. They will be completed in the fall of 1930 and will be used in foreign oil trade service, probably with Venezuela, the Argentine and Dutch West Indies.

RICHMOND, Va., Dec. 6.—The Standard Oil Co. of New Jersey again has been awarded the contract to furnish the gas plant of the city of Richmond with 4,000,000 gallons of gas oil during 1930, for $200,000, it has been announced by the city department of utilities.

CHICAGO, Dec. 7.—Ben J. Skinner is now representative of the Atlas Petroleum Co., Chicago in Michigan with headquarters at Kalamazoo.

Shipments From Southern California

LOS ANGELES, Dec. 7.—Shipment of Bulk petroleum from Southern California ports for week ending Nov. 30, were as follows: (All figures in Barrels)

Destination	Crude	Gasoline	Diesel	Distillate	Kerosene	Fuel	Gas-Oil
Pacific For.	138,352	183,680	121,740	.....	138,345	545,961	.....
Atlantic For.	.....	65,691	14,969	.....	.....	.....	.....
	Paint Thinner						
Atlantic Dom.	19,411	482,547	.....	78,926	.....	.....	80,362

Prices 10 Years Ago
Dec. 8, 1919

	Oklahoma	Penna.
58-60 U. S. Motor	16.00–16.25c	19.50–20.00c
80-84 Natural	22.75–23.00c	.....
Kerosene (41-43 Okla.; 47 w. w. Pa.)	9.50–9.75c	12.75–13.25c
Fuel Oil (24-26 Okla.; 38-40 Pa.)	$3.75–$4.00	10.50–11.00c
Crude (Okla. 35-35.9)	$2.50	$4.50
Chicago tank wagon	.....	21.00c

Prices A Year Ago
Dec. 10, 1928

	Oklahoma	Penna.
58-60 U. S. Motor	8.7976c	10.50–10.75c
Grade A Natural	9.00c	.....
Kerosene (Okla. 41-43; Pa., 47 w. w.)	5.625–5.75	7.75–8.25c
Fuel Oil (Okla. 24-26; Pa. 36-40)	$0.625–$0.675	4.75–5.00c
Crude (Okla. 35-35.9)	$1.31	$3.50
Chicago tank wagon	.....	15.00c

Chicago Resale Market

All Commodities Generally Unchanged

• Staff Special

CHICAGO, Dec. 7

OUTSIDE of a better demand for zero gas and fuel oils there was little activity in the Chicago resale market in the week ended Dec. 7. Many of the trade reported business was mostly of a routine nature and spent a good part of their time at the American Petroleum Institute meetings.

Considerable speculation was heard as to what effect the 1 cent reduction in gasoline and kerosene prices by the Standard of Ohio would have on the tank wagon schedule in this territory. A number of sellers expressed the opinion that there would be a price revision by the Standard of Indiana inside of two weeks, while others figured no change was likely this year.

Spot demand for U. S. Motor gasoline apparently was at a standstill, as most of the trade reported very little business. Movement of gasoline on contracts was reported excellent for this season of the year. Several refiners reported they had signed contracts with a number of jobbers for their 1930 gasoline requirements. Most of these contracts were based on the averages of various trade publications, date of shipment.

Practically all of the gasoline offered by Illinois, Indiana and Michigan refiners last week, for shipment into favorable points in Michigan and Ohio at prices 0.50 to 0.75 cents lower than the prevailing Mid-Continent market, was eliminated from the market and most of the sales reported this week were in Oklahoma and Texas goods.

There was very little change in prices of U. S. Motor gasoline out of the Mid-Continent and the bulk of sales continued to range at from 6.625 to 7.25 cents for Oklahoma goods and 6.625 to 6.75 cents on north and west Texas material. One or two carlot marketers reported buying a little Motor gasoline, for resale, at 6.375 cents in both Oklahoma and north Texas and they were offering this at 6.50 cents. On the other hand, a number of marketers said they were still unable to buy good Motor gasoline at less than 6.50 cents.

The higher gravity gasolines, especially 68-70, 350-360 e.p. and 64-66, 375 e.p. grades, were enjoying a good demand. Several sellers said they were paying little attention to 58-60 U. S. Motor and centering their attentions on moving high tests.

Kerosene continued inactive in practically all quarters and sales were reported at 0.125 to 0.25 cent lower on Dec. 7. Most sellers quoted 41-43 w.w. kerosene at 4.375 to 4.75 cents early in the week and at 4.25 to 4.50 cents on Saturday. An occasional sale at 4.125 and 4.625 cents was reported.

The tank car demand for zero gas and fuel oils improved considerably this week and a number of sellers advanced their prices. Distillate also was in better demand, although it was freely offered at present price levels. The market on U.G.I. gas oil was quiet and several sellers, who had previously quoted 2.875 or 3 cents, lowered their prices to 2.75 cents.

Tank wagon distributors of home burner oils continued to report an excellent business and consequently were taking more of an interest in the spot tank car market. Many of them have worked off a large portion of their stocks and were ordering replacements.

Several distributors reported that, effective Dec. 15, they would advance their delivered prices to consumers, 0.50 cent on all grades of gas and fuel oils. No change will be made in distillate prices. This advance will make a wide spread between delivered prices of the various distributors. Some of them continued to offer 18-22 fuel oil at 4.50 cents delivered. Others were selling this grade at 5 cents; the coming advance will bring their quotations to 5.50 cents.

Rather frequent periods of precipitation are predicted by the Chicago weather bureau for the Standard of Indiana territory next week. No extremes of temperature are likely.

Two Supply Makers Merge Export Business

ST. LOUIS, Dec. 9.—A company to conduct the export business of the Emsco Derrick & Equipment Co. and the Continental Supply Co. has been organized in New York, under the name of the Continental-Emsco Co., Inc., with headquarters at 74 Trinity Place, New York.

The Emsco Derrick & Equipment Co.'s office at 150 Broadway and the Continental company's office at 74 Trinity Place, have been closed. The business of both will be conducted by the newly-merged companies.

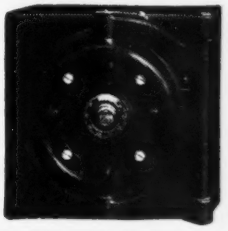
F. L. Convers, formerly in charge of the Emsco offices at New York, will be in charge of the new corporation.

Is this burglar spending your money?

He has made another successful raid upon a filling station. The money he is spending upon Wine, Women and Automobiles belongs to the owner of a station in a town a hundred miles away. Will he be spending your money next week? Not if you install a York Burglary Chest.

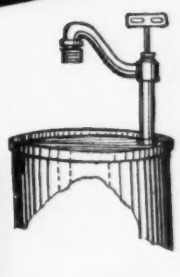
YORK SAFES

YORK SAFE *and* LOCK COMPANY
York, Pa.



You'll Sell More Oil Than Ever Before

Show your "drive-in" customers how they can save money buying in bulk. Sell them by the *drum* instead of by the gallon.



KWART KWICK
Home Oil Pump

Fits any drum or barrel—especially designed for the private user. Lowest-priced fool-proof home oil pump on the market. Works equally well with oil, gas, etc. Strongly built of brass, steel and cast iron—nothing to get out of order. Special quantity discounts to oil companies.

By distributing this pump with bulk sales, you can increase your oil volume 100% to 200%. Others are doing it. Mail coupon today for complete information and prices.

MAIL TODAY

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VIKING PUMP CO.
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Viking Pump Co., Dep't. B
Please send details and prices on your Kwart Kwick Pump.

Name.....

Town.....

State.....

Comparative Prices of 58-60 U. S. Motor Gasoline, 437 E. P., Group 3 and Point of Origin, to Jobbers Only

In Effect December 9

	Price F.O.B. Group 3		*Price F.O.B. Point of Origin*		*If for Particular Destination*
Oklahoma	7.2321	(Wt. Avg.)	7.2321	(Wt. Avg.)	.....
Kansas	6.875–7.125	.....	.....	.....	S. O. Neb. & Indiana Territory, etc.
Kansas	.....	.....	7.5000	(Wt. Avg.)	Kansas only.
North Texas	6.625–7.00	.....	6.50–6.75	.....	.....
West Texas	6.625–7.00	.....	6.50–6.75	.....	.....
Louisiana-Arkansas	6.875–7.125	.....	.....	.....	Michigan, Ohio and Indiana.
Louisiana-Arkansas	.....	.....	7.25	.....	State or differential haul.
Indiana-Illinois	6.875–7.25	.....	.....*	.....	S. O. Indiana territory except Detroit and vicinity. For Ohio on delivered basis only.

*Shipments made from E. Chicago, Ind., and Wood River, Ill., according to conditions and freight rates; no prices F.O.B. point of origin can be given.

Chicago Resale Market

CHICAGO, Dec. 9

ZERO gas and fuel oils were the most active commodities in the Chicago market last week with prices showing upward tendency. Spot gasolines were quiet with bulk of goods coming from Mid-Continent refineries. A few cars of Oklahoma and north Texas U. S. Motor moved at 6.50 cents, but minimum price of practically all sellers was 6.625 cents. Very little goods available from Michigan, Illinois and Indiana refineries at the low prices which prevailed last week.

Following prices represent sales made on group 3 freight basis, although goods may originate elsewhere:

	Prices Dec. 9	Prices Dec. 2	Prices Nov. 25
58-60 U.S. Motor, 437 e.p.	6.625– 7.25	6.625– 7.25	6.75 – 7.25
60-62 437 e.p. gasoline	6.75 – 7.50	6.875– 7.50	6.875– 7.50
60-62 400 e.p. gasoline	7.25 – 7.75	7.375– 7.75	7.375– 7.75
64-66 375 e.p. gasoline	7.875– 8.125	7.875– 8.125	7.875– 8.125
41-43 w.w. kerosene	4.25 – 4.50	4.375– 4.75	4.375– 4.75
38-40 straw distillate	3.75 – 4.00	3.75 – 4.00	3.75 – 3.875
32-36 ordinary dark gas oil	2.75 – 3.00	2.875– 3.00	2.875– 3.00
32-36 dark zero gas oil	3.125– 3.25	3.00 – 3.25	3.00 – 3.25
32-36 straw zero gas oil	†3.25 – 3.50	3.125– 3.375	3.125– 3.375
28-30 zero fuel oil	$1.15 –$1.20	$1.15 –$1.20	$1.15 –$1.20
28-30 fuel oil	$1.05 –$1.10	$1.05 –$1.10	$1.05 –$1.10
24-26 fuel oil	$0.85 –$0.90	$0.85 –$0.875	$0.85 –$0.875
18-22 fuel oil, low sulfur	$0.70 –$0.725	$0.65 –$0.675	$0.65 –$0.675
18-22 fuel oil, high sulfur zero	$0.70 –$0.75	$0.675–$0.725	$0.675–$0.725

Weighted Average Prices

OKLAHOMA

	Dec. 9		Dec. 2		Nov. 25	
	No. of cars	Price	No. of cars	Price	No. of cars	Price
58-60 U. S. Motor, 437 e.p.	42	7.2321	98	7.2219	49	7.2500
60-62 437 e.p. gasoline	No sales	reported	4	7.0625	2	7.3750
60-62 400 e.p. gasoline	4	7.5000	8	7.4219	4	7.5000
64-66 375 e.p. gasoline	6	7.7917	No sales	reported	2	8.1250

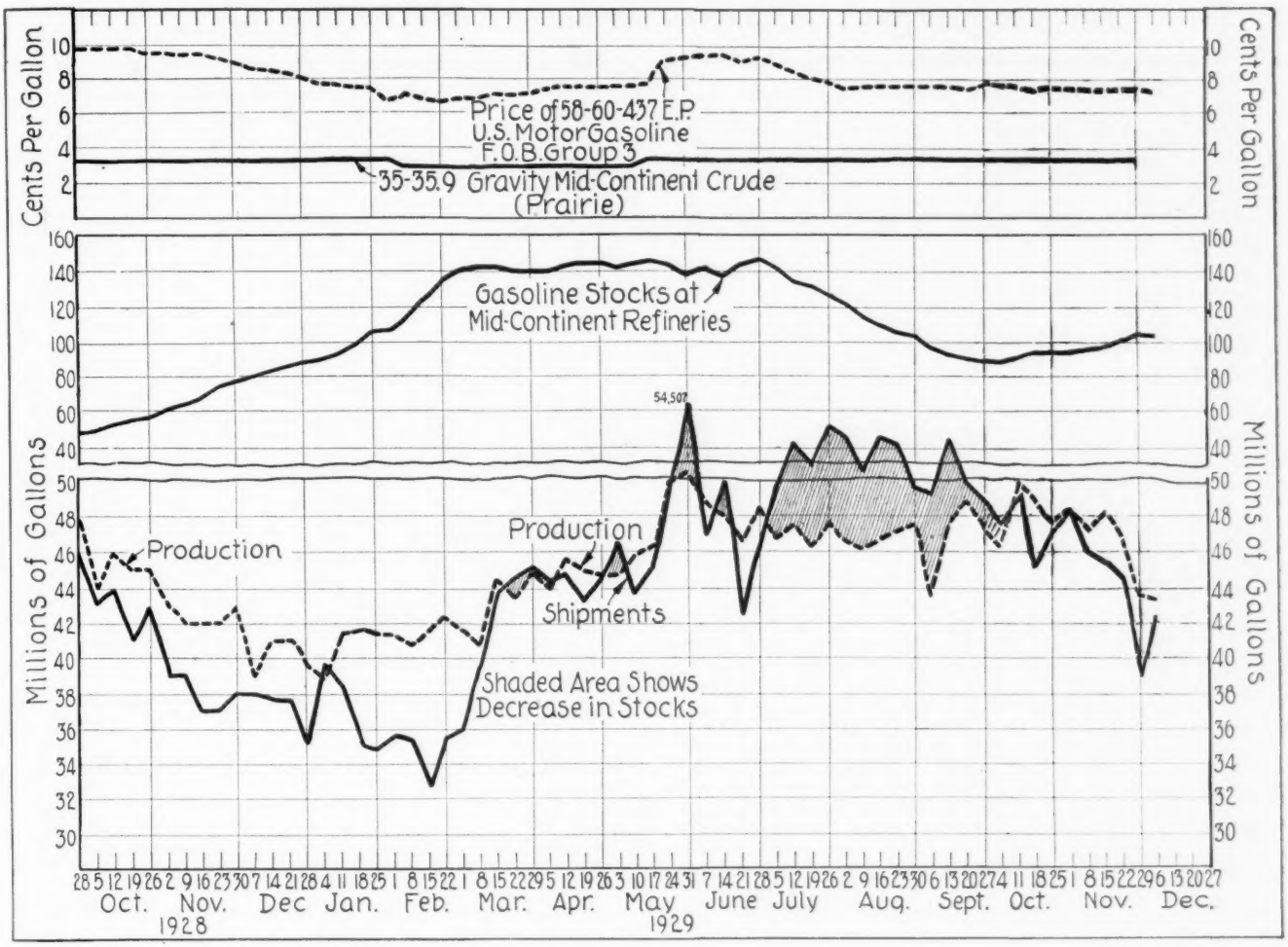
KANSAS

	Dec. 9		Dec. 2		Nov. 25	
	No. of cars	Price	No. of cars	Price	No. of Cars	Price
58-60 U. S. Motor, 437 e.p.	1	7.5000	No sales	reported	5	7.5000

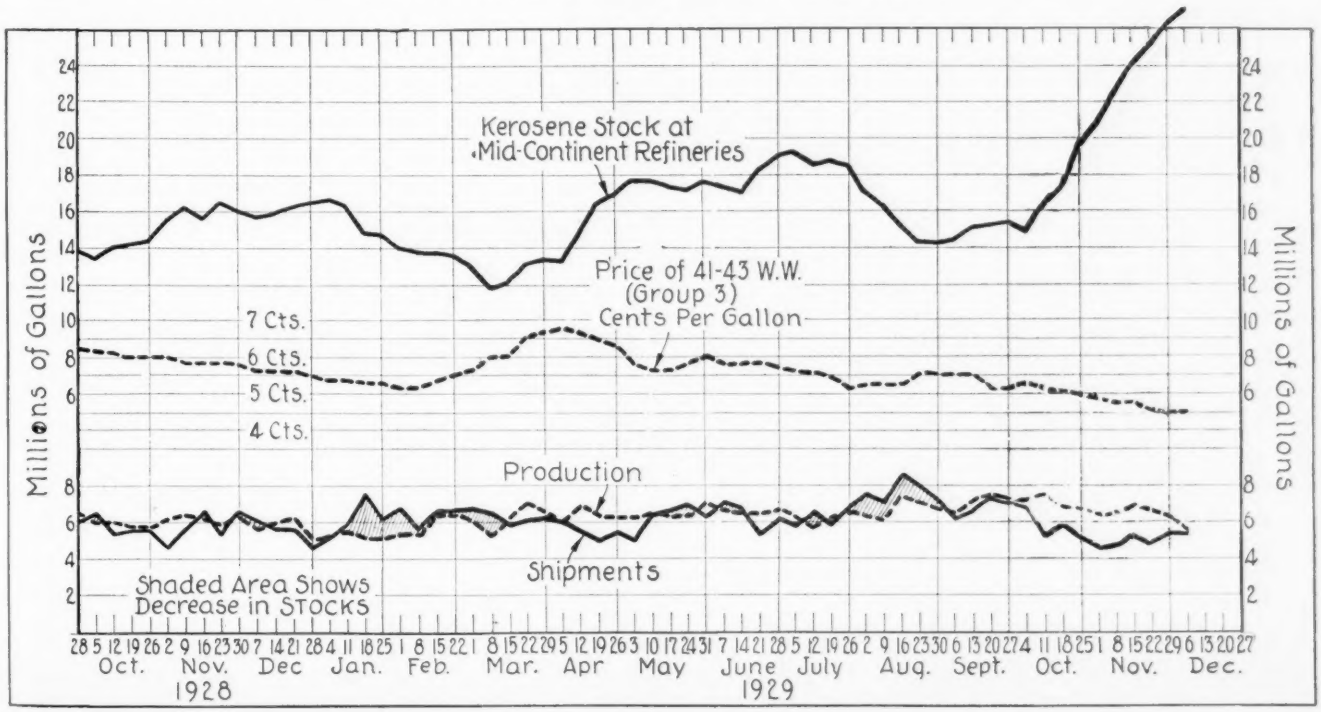
†Prices nominal

Barometer of Mid-Continent Refinery Market—Week Ending December 6

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 93 Plants to National Petroleum News


Cents Per Gallon
Price of 58-60-437 E.P. U.S. Motor Gasoline F.O.B. Group 3
35-35.9 Gravity Mid-Continent Crude (Prairie)
Gasoline Stocks at Mid-Continent Refineries
54,507
Millions of Gallons
Production
Shipments
Shaded Area Shows Decrease in Stocks
Oct. Nov. Dec Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1928
1929

Prices shown above are extended to date shown in Refinery Market and Crude tables in Market section of this issue and stocks, shipments and Production are extended to date as shown in the table on page 122



Refinery Markets on Light Oils and Lubricants

Prices given below are in cents per gallon, F. O. B. refinery except where $ is shown

(These Refinery Prices compiled in the OIL PRICE HANDBOOK for a whole year)

GASOLINE AND NAPHTHA

OKLAHOMA	Prices Dec. 9	Prices Dec. 2	Prices Nov. 25
48-50 450 e.p. naphtha...	6.50 – 7.00	6.75 – 7.00	6.75 – 7.00
50-52 450 e.p. naphtha...	6.50 – 7.00	6.75 – 7.00	6.75 – 7.00
56-58 450 e.p. gasoline...	6.625– 6.75	6.625– 6.75	6.625– 7.00
58-60 450 e.p. gasoline...	6.625– 6.75	6.75 – 6.875	6.75 – 7.00
64-66 390 e.p. gasoline...	7.625	7.50 – 7.625	7.50 – 7.75
68-70 350-360 e.p. gasoline	8.25 – 8.375	8.125– 8.25	8.00 – 8.25
PENNSYLVANIA			
52-54 Naphtha.....	7.25 – 8.00	7.25 – 8.00	7.25 – 8.00
54-56 Naphtha.....	7.25 – 8.25	7.50 – 8.25	7.50 – 8.25
58-60 U.S. Motor 437 e.p.	8.00 – 9.00	8.125– 9.00	8.25 – 9.00
60-62 400-410 e.p. gasoline	8.375– 9.00	8.50 – 9.25	8.50 – 9.25
64-66 390 e.p. gasoline....	8.625– 9.50	8.75 – 9.50	8.875– 9.50
68-70 350-360 e.p.....	9. 75 –10.50	10.00 –10.50	10.00 –10.50
OHIO (Quotations of S. O. Ohio. 4c state tax to be added.)			
U. S. Motor Gasoline			
Ohio, delivery at any point.....	10.00	10.00	10.00
KANSAS (F. O. B. refinery Kansas destination)			
60-62 400 e.p. gasoline...	7.50 – 7.75	7.50 – 7.75	7.75
64-66 375 e.p. gasoline...	7.75 – 8.00	7.75 – 8.00	8.00
NORTH TEXAS			
56-58 450 e.p. gasoline...	6.375– 6.625	6.50 – 6.625	6.50 – 6.625
58-60 450 e.p. gasoline...	6.375– 6.625	6.50 – 6.75	6.625– 6.75
58-60 U.S. Motor 437 e.p.	6.50 – 6.75	6.625– 6.875	6.75 – 7.00
60-62 400 e.p. gasoline...	7.00 – 7.25	7.00 – 7.25	7.00 – 7.25
64-66 390 e.p. gasoline...	7.375– 7.625	7.375– 7.625	7.50 – 7.625
64-66 375 e.p. gasoline...	7.75 – 8.00	7.75 – 8.00	7.75 – 8.00
68-70 350-360 e.p. gasoline	8.125– 8.375	8.00 – 8.25	8.00 – 8.25
****WEST TEXAS (F.o.b. West Texas refinery, for unrestricted shipment)**			
50-52 naphtha.....	6.00	6.00	6.00
58-60 437 e.p. gasoline...	6.25 – 6.50	6.25 – 6.625	6.375– 6.625
58-60 U.S. Motor 437 e.p. gasoline.....	6.50 – 6.75	6.50 – 6.75	6.625– 6.75
NORTH LOUISIANA (N. La., Ark. and Miss. destination)			
58-60 U.S. Motor gasoline	7.25	7.25	7.50
ARKANSAS (Ark., N. La. and Miss. destination)			
58-60 U.S. Motor 437 e.p.	7.25	7.25	7.50
CALIFORNIA (3c tax to be added to California gasoline prices if used in state.)			
54-58 U.S. Motor 437 e.p.	9.50 –10.50	‡9.50 –10.00	‡9.00 –10.00
58-61 375-400 e.p. gasoline	10.50 –11.50	10.50 –11.00	10.00 –11.00
42-45 Engine Distillate 445-480 e.p.....	7.50 – 8.00	7.50 – 8.00	7.50 – 8.00

‡For outside state shipment price was 7.25–8.25c on Oct. 21. 7.00–8.00c on Oct. 28 and Nov. 4. 6.50–7.25c on Nov. 11, 18 and 25. 7.00–7.75 on Dec. 2 and 9.

NATURAL GASOLINE

(Note: End point of all grades, not over 375 F. Corrosion test adopted Oct. 1, 1927; A.S.T.M. Method D130-27T; doctor test, July 2, 1928.)

OKLAHOMA			
Grade AA, 80-87.9, 90% Recovery.....	6.375	6.625	6.75 – 6.875
Grade A, 72-79.9, 90% Recovery.....	6.625	6.75 – 6.875	7.00 – 7.125
Grade BB, 84-92, 85% Recovery.....	5.875– 6.00	6.125– 6.25	6.25
Grade B, 76-83.9, 85% Recovery.....	5.875– 6.00	6.125– 6.25	6.25
Grade C, 80-92, 78% Recovery.....	5.75	6.125– 6.25	6.25
NORTH TEXAS (F. o. b. Breckenridge)			
Grade AA, 80-87.9, 90% Recovery.....	6.375	6.625	6.875
Grade A, 72-79.9, 90% Recovery.....	6.625	6.75 – 6.875	7.00 – 7.125
Grade BB, 84-92, 85% Recovery.....	6.00 – 6.125	6.125– 6.25	6.25 – 6.375
Grade B, 76-83.9, 85% Recovery.....	6.00 – 6.125	6.125– 6.25	6.25 – 6.375
Grade C, 80-92, 78% Recovery.....	5.875	6.125– 6.25	6.25 – 6.375

†Prices nominal ††Only one refiner quoting *Quotations only

NORTH LOUISIANA (F. o. b. Monroe District)	Prices Dec. 9	Prices Dec. 2	Prices Nov. 25
Grade AA.....	†6.75	†6.875	†7.125
Grade BB.....	†6.25	†6.50	†6.50
Grade C.....	†6.25	†6.50	†6.50
CALIFORNIA			
75-85, 375-390 e.p. blend	8.50 – 9.00	8.25 – 8.75	8.00 – 8.50

BURNING OILS

PENNSYLVANIA			
45 w.w. kerosene.....	6.25 – 6.75	6.375– 6.75	6.50 – 7.00
46 w.w. kerosene.....	6.625– 7.00	6.75 – 7.25	6.75 – 7.25
47 w.w. kerosene.....	6.75 – 7.25	7.00 – 7.50	7.00 – 7.50
300 mineral seal.....	7.00 – 7.75	7.00 – 7.75	7.00 – 7.75
OKLAHOMA			
41-43 w.w. kerosene.....	4.25 – 4.75	4.25 – 4.75	4.25 – 4.75
42-44 w.w. kerosene.....	4.50 – 5.25	4.625– 5.25	4.75 – 5.25
KANSAS (F. O. B. refinery Kansas destination)			
41-43 w.w. kerosene.....	4.75 – 5.00	4.75 – 5.00	5.00 – 5.25
42-44 w.w. kerosene.....	5.00 – 5.50	5.00 – 5.50	5.50
NORTH TEXAS			
40-42 w.w. kerosene.....	4.00	4.00 – 4.25	4.00 – 4.25
41-43 w.w. kerosene.....	4.00 – 4.25	4.25 – 4.375	4.25 – 4.50
NORTH LOUISIANA (N. La., Ark. and Miss. destination)			
41-43 w.w. kerosene.....	5.00 – 5.25	5.00 – 5.375	5.00 – 5.50
42-44 w.w. kerosene.....	5.25 – 5.50	5.50	5.50
ARKANSAS (Ark., N. La. and Miss. destination)			
42-44 w.w. kerosene.....	5.25 – 5.50	5.50	5.50
CALIFORNIA			
38-40 w.w. kerosene.....	5.50 – 6.00	5.00 – 6.00	5.00 – 6.00

NEUTRAL OIL

PENNSYLVANIA			
Vis.		**(Viscosity at 70°F.)**	
200 No. 3 Assoc. Filt.....	24.50 –27.00	24.50 –27.00	24.50 –27.00
180 No. 3 Assoc. Filt.....	19.50 –23.00	19.50 –23.00	19.50 –23.00
150 No. 3 Assoc. Filt.....	15.50 –18.00	15.50 –18.00	15.50 –18.00
		(Non Viscous)	
34 Grav. 330-340 Flash..	7.25 – 7.75	7.25 – 7.75	7.25 – 7.75
****OKLAHOMA**			
Vis. Color		**(Viscosity at 100°F.)**	
100—No. 2.....	6.00 – 7.00	6.00 – 7.00	6.00 – 7.00
150—No. 3.....	7.50 – 8.00	7.50 – 8.00	7.50 – 8.00
150—No. 4.....	6.75 – 7.50	6.75 – 7.50	6.75 – 7.50
180—No. 3.....	9.00 – 9.50	9.00 – 9.50	9.00 – 9.50
180—No. 4.....	8.75 – 9.00	8.75 – 9.00	8.75 – 9.00
180—No. 5.....	8.50 – 8.75	8.50 – 8.75	8.50 – 8.75
200—No. 3.....	10.00 –12.00	9.75 –10.00	9.75 –10.00
200—No. 4.....	9.00 –11.00	9.00 – 9.75	9.00 – 9.75
200—No. 5.....	9.50 –11.00	9.00 – 9.25	9.00 – 9.25
220—No. 3.....	12.50 –13.50	12.50 –13.50	12.50 –13.50
220—No. 4.....	12.00 –12.50	12.00 –12.50	12.00 –12.50
220—No. 5.....	11.00 –12.00	11.00 –12.00	11.00 –12.00
240—No. 3.....	13.00 –16.00	13.00 –13.50	13.00 –13.50
240—No. 4.....	12.00 –13.00	12.00 –13.00	12.00 –13.00
240—No. 5.....	11.00 –13.00	11.00 –12.50	11.00 –12.50
280—No. 3.....	15.00 –16.00	14.00 –16.00	14.00 –16.00
280—No. 4.....	13.00 –16.00	12.50 –15.00	12.50 –15.00
280—No. 5.....	12.00 –14.00	12.00 –14.00	12.00 –14.00

****Represents Both Sales and Quotations.**

Refinery Markets Wax, Lubricants, Heavy Oil

Prices given below are in cents per gallon, F. O. B. refinery except where $ is shown

(For quick reference to Refinery Prices, get the OIL PRICE HANDBOOK, published annually)

GULF COASTAL

Vis.	Color	Prices Dec. 9	Prices Dec. 2	Prices Nov. 25
		(Viscosity at 100°F., pour test 0)		
100	No. 2 Pale	6.00 – 7.00	6.00 – 7.00	6.00 – 7.00
200	No. 3 Pale	9.00 – 9.50	9.00 – 9.50	9.00 – 9.50
300	No. 3 Pale	10.00 –10.75	10.00 –10.75	10.00 –10.75
500	No. 3½ Pale	11.50 –12.00	11.50 –12.00	11.50 –12.00
750	No. 4 Pale	12.50 –13.00	12.50 –13.00	12.50 –13.00
200	No. 5½ Red Oil	8.00 – 8.75	8.00 – 8.75	8.00 – 8.75
300	No. 5½ Red Oil	9.00 –10.00	9.00 –10.00	9.00 –10.00
500	No. 6 Red Oil	9.50 –10.00	9.50 –10.00	9.50 –10.00
750	No. 6 Red Oil	11.50 –12.00	11.50 –12.00	11.50 –12.00

CALIFORNIA

Vis.	Color	(Viscosity at 100°F.)		
100	No. 3	9.50 –10.00	9.50 –10.00	9.50 –10.00
200	No. 3	11.50	11.50	11.50
300	No. 3	13.00	13.00	13.00
450	No. 3	15.50	15.50	15.50
550	No. 3	16.50	16.50	16.50
600	No. 3	17.00	17.00	17.00
200	No. 5	11.00	11.00	11.00
300	No. 5	12.00	12.00	12.00
400	No. 5	14.00	14.00	14.00
500	No. 5	15.00	15.00	15.00
600	No. 5	16.00	16.00	16.00
700	No. 7	18.00	18.00	18.00

CYLINDER STOCKS

**OKLAHOMA

190-200 Vis. D at 210° Brt. St.	42.00	40.00 –42.00	40.00 –42.00
150-160 Vis. D at 210° Brt. St.	37.00	36.00 –37.00	37.00
150-160 Vis. E 210° Brt. St.	35.00 –36.00	33.00 –35.00	33.00 –35.00
600 St. Ref. Olive Green	9.00 –17.00	9.00 –17.00	9.00 –17.00
600 St. Ref. Dark Green	9.00 –11.00	9.00 –11.00	9.00 –11.00
Black Oil	5.00	5.00	5.00

PENNSYLVANIA (A. S. T. M. Tests)

600 Steam Refined, filterable	26.00 –27.00	27.00 –28.00	27.00 –28.00
650 Steam Refined	30.50 –31.50	30.50 –31.50	31.00 –31.50
600 Flash	32.50 –34.50	32.50 –34.50	33.00 –34.50
625 Flash	36.00 –37.00	36.00 –37.00	36.00 –37.00
600 Warren E	32.00 –32.50	32.00 –32.50	32.00 –32.50
600 Oil City E	30.50 –32.00	31.00 –32.00	31.00 –32.00
600 D Filtered	36.50 –37.00	36.50 –37.00	36.50 –37.00
Cold Test Stock, 40-50 p. p., 140-150 vis. at 210° 540-550 flash, No. 8 color	‡46.00 –47.50	47.50 –49.00	49.00 –50.00
40-50 p.p., 140-150 vis. at 210°, 540-550 flash, No. 6-6½ color diluted	44.00 –46.00	46.50 –47.00	47.00 –48.00

‡Lower pour test stock quoted 1 to 2 cents higher.

WAX

PENNSYLVANIA (Per pound, New York)

122-124 white crude scale, a.m.p.	3.125– 3.25	3.125– 3.375	3.375– 3.50
124-126 white crude scale, a.m.p.	3.125– 3.25	3.25 – 3.50	3.50

**OKLAHOMA

124-126 White Crude Scale, a. m. p.	3.00	3.00 – 3.125	3.00 – 3.125

CALIFORNIA

White crude scale, per pound, ton lots, a.m.p.	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50

DISTILLATE, GAS AND FUEL OIL

PENNSYLVANIA (For outside Pittsburgh district)

36-40 fuel oil	4.75 – 5.00	4.875– 5.25	5.00 – 5.25
30-34 fuel oil	4.625– 4.75	4.75 – 5.00	4.75 – 5.00
28-32 fuel oil	4.625– 4.75	4.75 – 5.00	4.75 – 5.00

†Prices nominal ††Only one refiner quoting *Quotations only

OKLAHOMA

	Prices Dec. 9	Prices Dec. 2	Prices Nov. 25
38-40 straw distillate	3.75 – 4.00	3.75 – 4.00	3.75 – 4.00
36-38 straw distillate	3.75	3.75	3.625– 3.75
32-36 straw gas oil	3.00 – 3.125	2.875– 3.125	2.875– 3.00
32-36 straw gas oil zero	3.25 – 3.50	3.25 – 3.375	3.25 – 3.375
32-36 dark gas oil	2.875– 3.00	2.875– 3.00	2.75 – 3.00
32-36 dark gas oil zero	3.25 – 3.375	3.125– 3.375	3.125– 3.25
28-30 zero fuel oil	$1.20	$1.15 – 1.20	$1.175– 1.20
28-30 fuel oil (in bbls.)	$1.10 – 1.15	$1.05 – 1.10	$1.05 – 1.10
26-28 fuel oil (in bbls.)	$0.95 – 1.05	$0.90 – 1.00	$0.90 – 1.00
24-26 fuel oil (in bbls.)	$0.90 – 1.00	$0.85 – 0.95	$0.875– 0.975
22-26 fuel oil (in bbls.)	$0.80 – 0.90	$0.80 – 0.90	$0.775– 0.85
18-22 fuel oil (in bbls.)	$0.75 – 0.775	$0.70 – 0.775	$0.675– 0.75
16-20 fuel oil (in bbls.)	$0.65 – 0.80	$0.65 – 0.75	$0.65 – 0.75
14-16 fuel oil (in bbls.)	$0.65 – 0.80	$0.65 – 0.75	$0.65 – 0.75

KANSAS (F. O. B. refinery Kansas destination)

38-40 straw distillate	4.00 – 4.125	4.00 – 4.25	4.00 – 4.25
36-38 straw distillate	4.00	4.00	3.875– 4.00
32-36 straw gas oil	3.25 – 3.50	3.125– 3.50	3.125– 3.375
18-22 fuel oil	$0.80 – 0.90	$0.75 – 0.80	$0.725– 0.775
10-14 fuel oil	$0.775– 0.825	$0.725– 0.75	$0.70 – 0.75

NORTH TEXAS

38-40 straw distillate	3.625– 3.75	3.75	3.625– 3.75
38-40 p.w.treated distillate	3.75 – 4.00	3.75 – 4.00	3.75 – 4.00
32-36 gas oil, cracked	2.75 – 3.00	2.875– 3.00	2.875– 3.00
32-36 St. reduced gas oil	2.625– 2.75	2.50 – 2.75	2.625– 2.75
24-26 fuel oil (in bbls.)	$0.725– 0.75	$0.725– 0.75	$0.675– 0.725
20-24 fuel oil	$0.60 – 0.70	$0.60 – 0.675	$0.60 – 0.65
18-22 fuel oil	$0.60 – 0.65	$0.575– 0.65	$0.55 – 0.65

**WEST TEXAS (F. o. b. West Texas refinery, for unrestricted shipment)

34-38 gas oil	2.625– 2.75	2.625– 2.75	2.75
30-32 gas oil	2.375– 2.75	2.50 – 2.75	2.625– 2.75
28-30 zero gas oil	3.00	2.50 – 2.875	2.75 – 3.00
18-22 fuel oil	$0.575– 0.70	$0.525– 0.65	$0.525– 0.60

NORTH LOUISIANA (N. La., Ark. and Miss. destination)

32-36 gas oil, dark	3.50	3.50	3.25 – 3.50
32-36 gas oil, straw	3.50	3.50	3.25 – 3.50
14-16 fuel oil (in bbls.)	$0.75 – 0.85	$0.75 – 0.85	$0.75 – 0.85

ARKANSAS (Ark., N. La. and Miss. destination)

32-36 gas oil, straw	3.50	3.25 – 3.50	3.25 – 3.50
32-36 dark gas oil	3.50	3.25 – 3.50	3.25 – 3.50
28-30 gas oil	3.25	3.25	3.00 – 3.25
14-16 fuel oil	$0.75 – 0.85	$0.75 – 0.85	$0.675– 0.825

CALIFORNIA (F. o. b. San Joaquin Valley. At San Francisco 4c per bbl. more)

14-18 fuel oil (per bbl.)	$0.40 –$0.60	$0.45 –$0.60	$0.45 –$0.65
14-18 Bunker oil (per bbl.)	$0.70 –$0.75	$0.70 –$0.75	$0.70 –$0.75
30-34 gas oil (per bbl.)	$0.80 –$0.90	$0.80 –$0.90	$0.80 –$0.90
27 Plus Diesel oil (per bbl.)	$0.80 –$0.90	$0.80 –$0.90	$0.80 –$0.90

PETROLATUMS

PENNSYLVANIA (In barrels, carload lots, f. o. b. refinery. In tank cars ⅛c to ¾c per pound less.) Two refiners quoting.

Snow White	8.75 – 9.00	8.75 – 9.00	8.75 – 9.00
Lily White	7.75 – 8.00	7.75 – 8.00	7.75 – 8.00
Cream White	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00
Light Amber	3.75	3.75	3.75
Amber	3.50	3.50	3.50
Red	3.25	3.25	3.25

PETROLEUM COKE

**OKLAHOMA

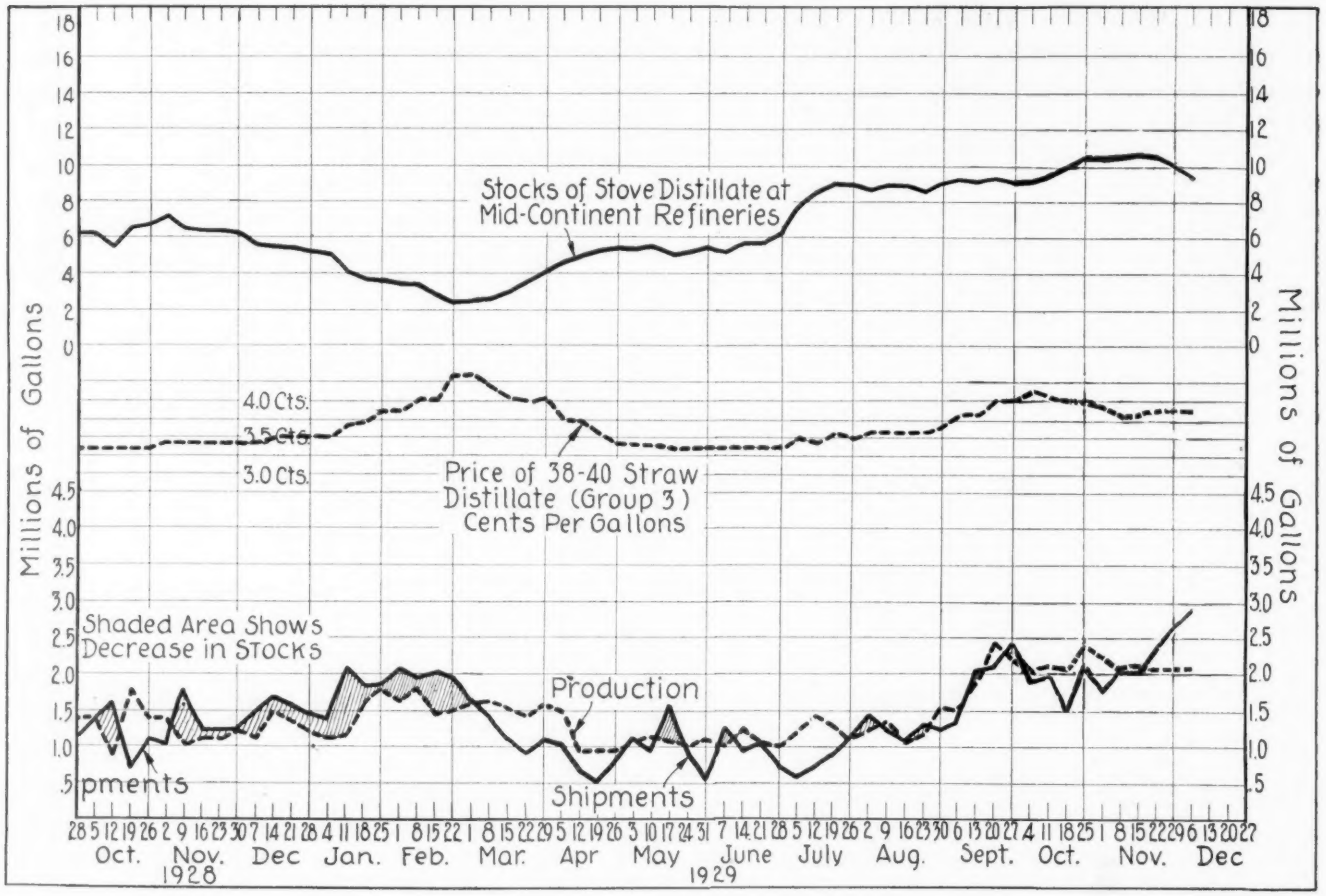
(Per ton in car lots)

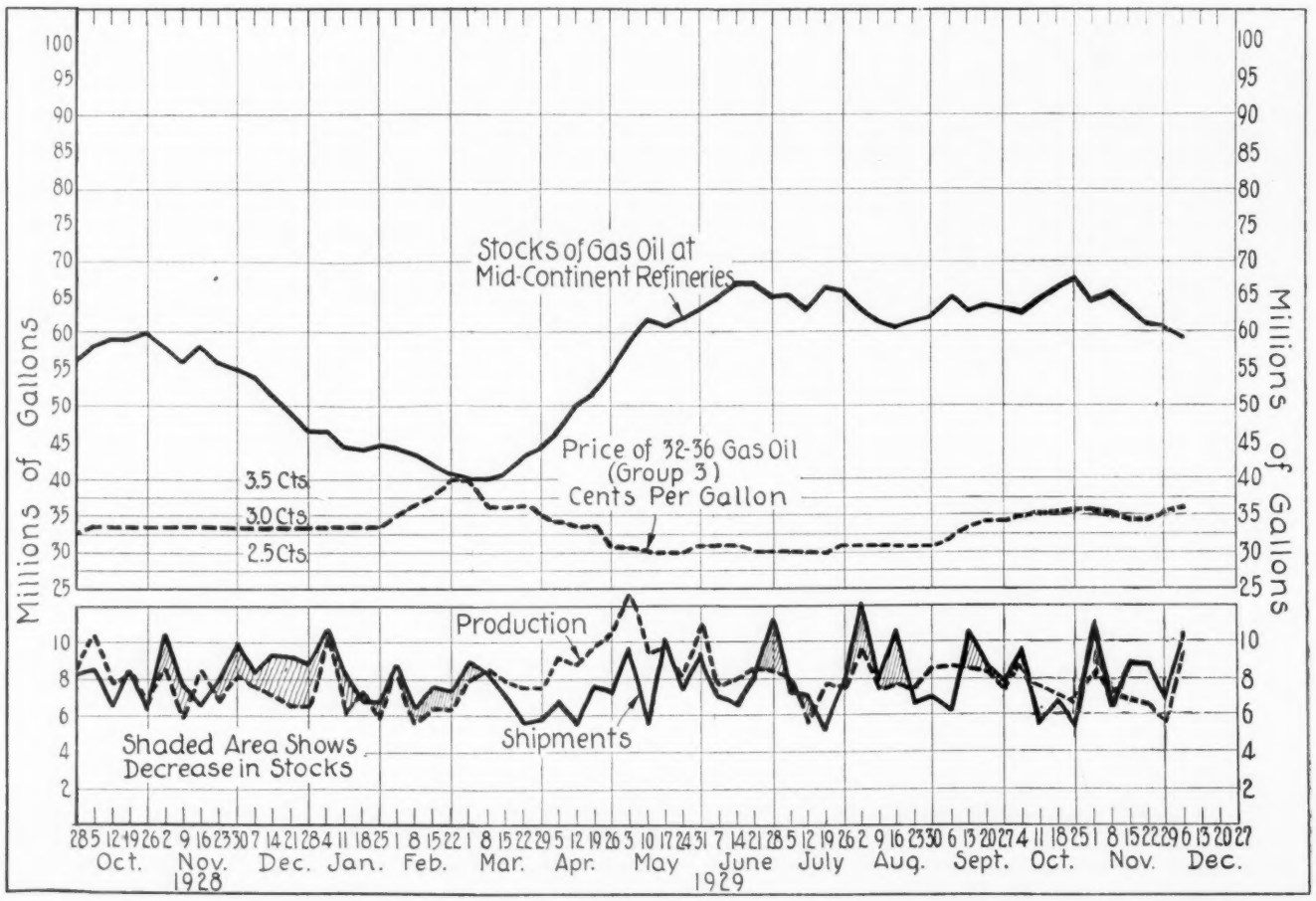
Lump	$4.50 – 5.00	$4.50 – 5.00	$4.50 – 5.00
Still run	$3.00	$3.00	$3.00
Breeze	$2.00	$2.00	$2.00

**Represents Both Sales and Quotations.

Barometer of Mid-Continent Refinery Market—Week Ending December 6

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 93 Plants to National Petroleum News


Millions of Gallons
Millions of Gallons
Stocks of Stove Distillate at Mid-Continent Refineries
4.0 Cts.
3.5 Cts.
3.0 Cts.
Price of 38-40 Straw Distillate (Group 3) Cents Per Gallons
Shaded Area Shows Decrease in Stocks
Production
Shipments
Oct. Nov. Dec Jan. Feb. Mar. Apr May June July Aug. Sept. Oct. Nov. Dec
1928
1929


Millions of Gallons
Millions of Gallons
Stocks of Gas Oil at Mid-Continent Refineries
3.5 Cts.
3.0 Cts.
2.5 Cts.
Price of 32-36 Gas Oil (Group 3) Cents Per Gallon
Production
Shipments
Shaded Area Shows Decrease in Stocks
Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1928
1929

Richfield Oil Company

Sets New Speed Record

Unloads Gas at Los Angeles Air Field at rate of 30 gallons per minute

---

TRUCK TIRE USED ON RUN

100%

GOODRICH HEAVY DUTY SILVERTOWNS

SERVICE sells gas to airport officials on the West Coast as well as pilots of planes and automobiles the country over. And service nowadays *necessitates speed!*

Speed in producing. Speed in refining. Speed in delivery. In fact, *speed* right up to the time your truck drives away leaving a satisfied buyer.

With Goodrich Heavy Duty Silvertowns you can truck both solid tire loads of construction materials out in the oil fields and maintain high speed delivery service over simmering city pavements with equal ease.

The New Goodrich Universal Heavy Duty Silvertown has:

(1) An unusually strong carcass of reinforced construction. (2) Rows of "teeth" like the undershot jaw of a bulldog give *added* traction from sides of ruts. (3) Top tread areas equal to assure traction and *even* wear on smooth roads. (4) *Twin* beads fit the tire snugly to rim and help resist "side-roll" wear. (5) The tire toughened *throughout* by the famous Goodrich "water cure."

• • •

The B. F. Goodrich Rubber Company, Est. 1870, Akron, Ohio. Pacific Goodrich Rubber Co., Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ont.

Photo shows Richfield Oil Company's new $12,500 truck which carries a 1,150 gallon load and is equipped with an electric jimmy that unloads 30 gallons of gas per minute

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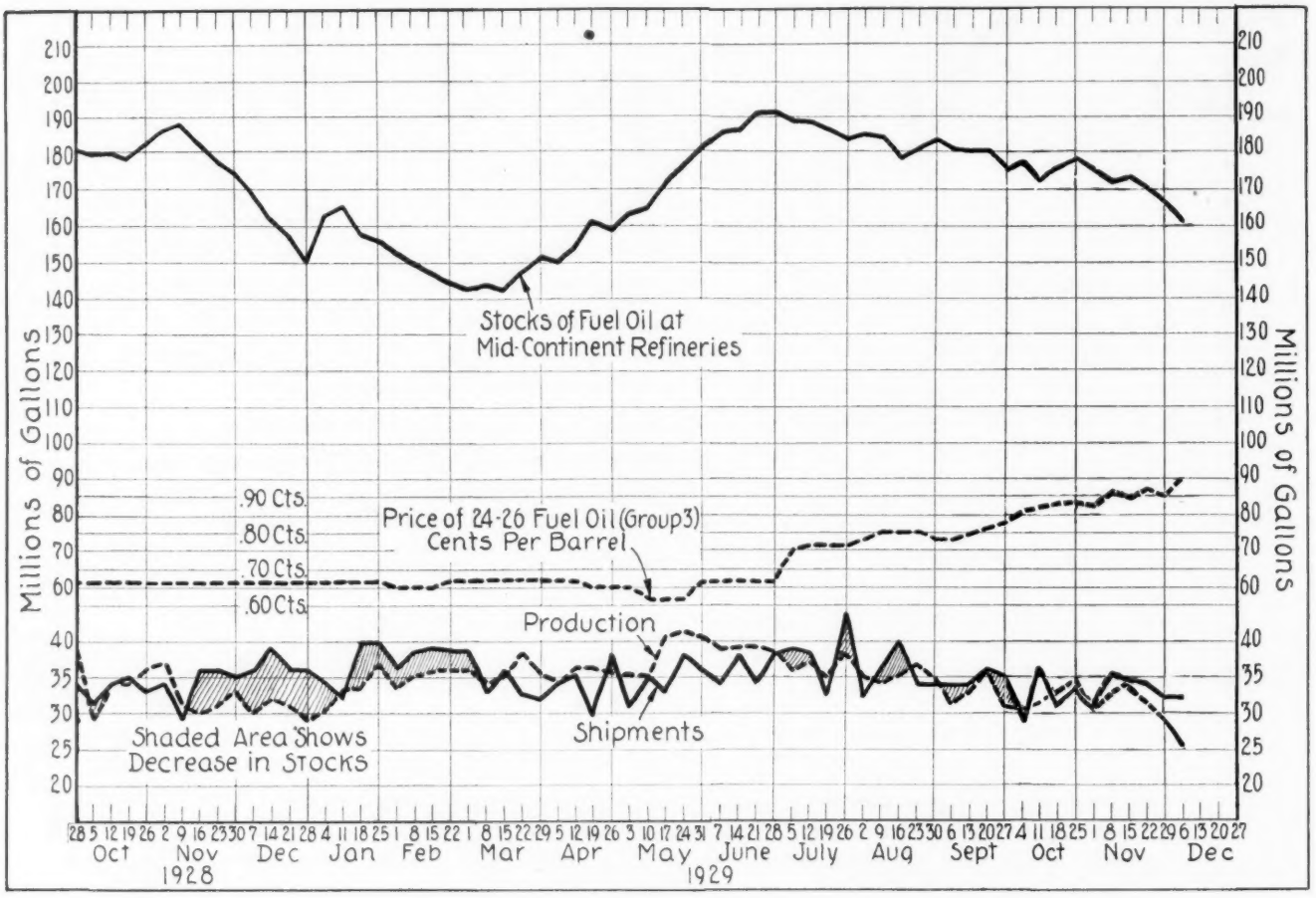
Goodrich *Truck Tires . .*

Barometer of Mid-Continent Refinery Market—Week Ending December 6

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 93 Plants to National Petroleum News


Millions of Gallons
Millions of Gallons
Stocks of Fuel Oil at Mid-Continent Refineries
.90 Cts.
.80 Cts.
.70 Cts.
.60 Cts.
Price of 24-26 Fuel Oil (Group 3) Cents Per Barrel
Production
Shipments
Shaded Area Shows Decrease in Stocks
Oct Nov Dec Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec
1928
1929

California Refinery Market

Prices Steady Despite Quiet Demand

LOS ANGELES, Dec. 5

ALTHOUGH prices in California markets were generally steady during the past week, spot business did not live up to expectations of the trade. Some commodities were quoted at higher prices than those posted for the previous week but this was almost entirely due to a shortage on the part of some companies, through failure to produce, rather than because of good demand.

Exports of petroleum products from southern California ports to foreign countries showed an increase for the week ended Nov. 30 but most of the goods so involved was said to have been under contract. No spot sales were reported by companies owning marine terminals in San Pedro harbor.

One of the larger Independent companies reported that bunker business was on the increase and that nearly 2,000,000 barrels of bunker oil and diesel oil already had been sold under contracts for 1930. Bunker oil at San Pedro harbor was being quoted at from $0.65 to $0.70 by this company, and diesel oil from $0.80 to $0.85 per barrel.

Curtailment of production in California has resulted in less natural gasoline being produced. Prices for this commodity were 0.25 cent higher. Several comparatively large spot sales of natural gasoline were reported during the past week at 8.50 cents and some refiners reported obtaining as high as 9 cents a gallon.

Many of the trade expect that as production in the flush oil fields of California is reduced further, natural gasoline will bring still higher prices in the open market.

U. S. Motor gasoline for shipment out of the state brought from 7 to 7.75 cents a gallon. By far the majority of sales were made at 7 cents with only a few at the higher figure.

U. S. Motor—sold to the very few jobbers left in the state of California—was moving mostly at from 9.50 to 10.50 cents although several small lots were reported sold at 8.50 cents. Sales were made at the low figure only when small refiners found themselves pinched for storage and had to unload.

Kerosene prices advanced to 5.50 to 6 cents per gallon under the stimulus of heavy demand.

In an effort to unload accumulating fuel oil stocks, several refiners reduced their prices to as low as $0.40 per barrel. A few were asking prices ranging up to $0.60 but they reported most of their production was under contract and their spot quotations were more or less nominal.

Strenuous efforts are being made by major companies to get the California retail gasoline situation under control by the first of the year. One company was reported to have threatened to cut the retail price if small refiners do not raise their posted service station prices to 19.50 cents, the price posted at stations selling major company gasolines.

COLOR

COLOR, as a merchandising help, has been boosting the sales of innumerable products. From motor conveyances to perambulators, from dainty sun-room fittings to kitchen tables, *Color* has given new life. In Wisconsin, a manufacturer of sanitary plumbing fixtures has created an everlasting niche for himself, simply by giving a touch of *Color*.

And now, the gasoline industry, having developed motor fuels of better properties, calls in *Color* to aid it in presenting its new product. For, *Color* distinguishes. *Color* impresses. *Color* attracts. *Color* invites.

That the public has accepted *Colored* gasoline is attested by the fact that, from the Atlantic to the Pacific, from far north of the Canadian line to the Mexican border, motorists are buying in increasing volume Blue Gasoline, Green Gasoline, Purple Gasoline, Violet Gasoline, as well as Red Gasoline. Yes, of different tints, for in the scale of colors there are varieties distinct enough to afford individualism for the most exacting. Dykem *Colors* are being widely used in this means of *Color*-branding.

Are you using *Color* to help you in the sale of your new motor fuels? If not, there is a *Dykem Color* that can also materially assist you.

Just write, telling us Colors you would like to see, and samples will be gladly sent you.

DYESTUFFS & CHEMICALS, INCORPORATED

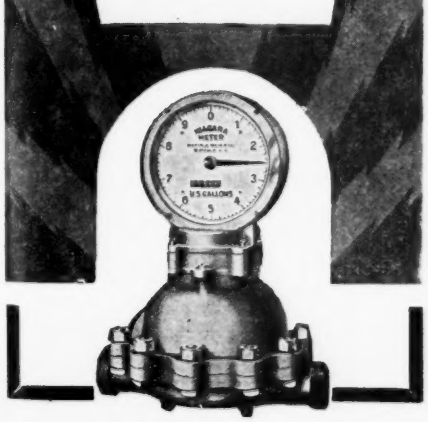
11th & Monroe Sts. St. Louis, Mo.

DEPENDABILITY

The Niagara meter never forgets—never jots down wrong totals—never delivers uncounted gallons of gasoline or oil that cut into profits. If the Niagara registers 50, fifty gallons have gone through—if 50,000, fifty thousand gallons have been delivered, and recorded so they'll be paid for. It is accurate.

The Niagara installed today is installed for years from now—its dependability is permanent. It is "rugged" structurally and simple mechanically. Send today for the new catalog of these familiar meters.

BUFFALO METER COMPANY
2889 Main Street
Buffalo, N. Y.



Pennsylvania Market

Prices Drop in Quiet Market

CLEVELAND, Dec. 9.—Several soft spots developed in western Pennsylvania refinery markets last week. Substantial price reductions were recorded for practically all commodities, neutral oils and filtered cylinder oils being the only ones to buck the trend of the general market.

A good bit of the distress gasoline which hung over the market at the beginning of the week was eliminated and a minor upward action in prices followed. However, toward the end of the week small lots of U. S. Motor again appeared in the market at 8 cents and although it was not freely offered at this price, the volume was sufficient to be partially representative of the general market.

The majority of refiners and resale agents quoted 8.125 to 8.375 cents for full specification U. S. Motor gasoline.

Prices for all grades of kerosene dropped 0.125 to 0.375 cent a gallon. Water white kerosene, 45 gravity, was freely offered at 6.25 cents against a low of 6.375 cents the week before. Several sizable sales for shipments to Atlantic seaboard refiners were reported. Demand from nearby jobbers was said to be at low ebb.

According to reports, steel mills in the Pittsburgh district were taking less fuel oil due to general slowing up of operations. Other channels were unable to absorb the overflow from refiners with the result that prices in some quarters were reduced 0.125 to 0.25 cent. Fuel oils with low cold test, however, were relatively scarce and prices for these grades were fairly steady.

Demand for bright stock was off considerably last week and prices lost about 0.5 cent a day on an average. Quotations for No. 8 color stock with 40-50 pour test stood at 46 to 47.50 cents a gallon on Dec. 7 against a range of 48.50 to 49 cents prevailing at the beginning of the week. Darker oil with approximately the same pour test sold proportionately lower; the minimum quotation for this grade was 44 cents.

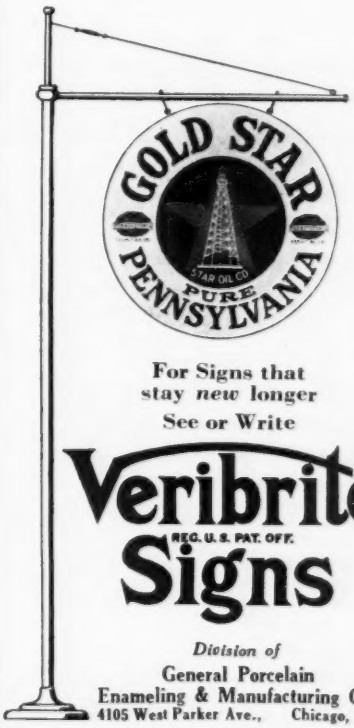
Steam refined stock also was down but price recessions were not as severe in this section of the market. Filterable 600 steam refined was quoted 1 cent lower at 26 cents. One large bright stock manufacturer reported he had covered on part of his December requirements of 600 steam refined at 25 cents.

Demand for neutral oils was fairly good and prices were generally unchanged.

"Against all of my ravaging elements, at the service station or on the side of the open road, VERIBRITE Signs remain bright, colorful and lustrous."

Old Man Weather

Veribrite Signs are genuine porcelain enameled on specially processed iron.



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Veribrite
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Signs

Division of
General Porcelain Enameling & Manufacturing Co.
4105 West Parker Ave., Chicago, Ill.

Eastern Domestic Markets

Gasoline Quiet; Burning Oils Active

Staff Special
NEW YORK, Dec. 7

EASTERN gasoline markets were extremely quiet the past week. A 2 cent reduction in tank wagon prices in upper New York state was the only outstanding feature. Heavy oils were in good demand. Prices for all commodities were unchanged with the exception of furnace oil and gas oil at New York and Boston.

Spot gasoline movement was slow in all districts. According to the reports of several traders the price structure was less sound than it has been for several weeks. Shading of prices was reported at New York and Boston but this was not sufficiently prevalent to cause general price reductions. One company at Philadelphia late Saturday was said to have advanced its quotation for U. S. Motor gasoline to 9.50 cents. The advance, however, could not be confirmed.

One company at New York reported accepting one or two small orders for U. S. Motor at 8.625 cents, but the majority of companies continued to quote a minimum of 8.75 cents. There were no reports of shading 8.75 cents for U. S. Motor in barges at New York harbor.

The price shading at Boston was being done only by one company, according to reports. Goods so involved was moving at 10.15 cents, delivered, whereas other sellers were asking 10.25 cents.

At more southern points on the seaboard the price remained at 9 cents. Suppliers in the Jacksonville, Charleston, Savannah and Norfolk districts, did not take the slow spot market as an indication that price reductions were in the offing. Most of the goods moving in those localities is under contract and spot business is never very brisk.

Several market observers at New York looked for prices all along the seaboard to remain at present levels until after the first of the year at least. They believe this will be the case until after refiners can take inventory. Auditors of two companies were reported to have said their companies would not make any change in prices. What to expect in the way of prices at the beginning of the new year is, of course, problematical, but records for the past three or four years, as kept by one company, show that there usually has been a decline. Most observers feel if there is a decline in prices this year it will be small.

The tank wagon reduction upstate, by the Standard of New York on Dec. 2, was made to reestablish the 2 cent margin between tank wagon and service station prices which was erased Nov. 30 when the Standard reduced the service station price only 2 cents. The change affects Rochester, Buffalo, and their respective territories.

Heavy oils were active and prices advanced at Boston and New York. Demand has been brisk for the past several weeks and several sellers were out of the market. One company reported it expected to move 100,000 barrels of gas oil during December. Furnace oil price ranges were lower both at Boston and New York. One or two companies who had been quoting 6.50 cents dropped their prices 0.25 cent.

Bunker C fuel oil prices were unchanged at $1.05 per barrel at both New York and Boston. Contracts have been made over next year with $1.05 as the base price which would indicate the trade did not expect much change in this market. Some of these contracts have a maximum of $1.20 per barrel. One Boston supplier said he would consider contracts over the next two years on the above basis.

Kerosene prices on the seaboard continued to be affected by those prevailing in Pennsylvania. One Eastern supplier bought a number of cars of 45 water white from a Pennsylvania refiner at 6.375 cents with option on several more cars at the same figture. This was early in the week. He had not exercised the option up to the end of the week believing he would be able to get a better price. Eastern suppliers were quoting from 7.75 to 8 cents, f.o.b. the seaboard.

Gulf Coast Markets

Large Contract for Panuco Crude Closed

Staff Special
NEW YORK, Dec. 7

GULF markets continued fairly active the past week, although there was not as much interest displayed as there was during the previous week. Panuco crude was quoted higher and a large sale was reported for export. A buyer from the Continent was in the market and there was a report of a cargo being placed which could not be confirmed.

Prices on heavy Panuco crude, quoted f.o.b. steamer at Tampico, advanced to $0.65 to $0.70 per barrel, exclusive of tax. A New York broker early in the week reported he had sold in the past two weeks approximately 350,000 barrels over a period at prices ranging from $0.65 to $0.70 per barrel. The goods were for shipment to Germany. Some suppliers were quoting up to $0.72 but their quotations were not considered representative of the market in view of the latest sale.

A gasoline cargo was sought by a New York broker around the middle of the week for shipment to the Continent. It was for approximately 70,000 barrels of 64-66, 390 end point goods to be shipped in January or February. The broker reported he was negotiating to move the stuff at prices below those posted by the Export Association, and expected to reach a definite understanding with the supplier within a week or two. He did not reveal the identity of the buyer.

Confirmation of a report that an English concern had purchased a part cargo of approximately 15,000 barrels of 64-66, 390 end point goods could not be obtained.

The movement of cased gasoline was reported good although not as heavy as early in the fall when the market was in excellent shape. Inquiries were received from the Far East the past week, although none resulted in business. One seller reported an inquiry from China for 2000 cases of U. S. Motor a month over next year. Another inquiry for 2000 cases of 64-66, 375 end point gasoline for prompt shipment to China was in the market.

There were no price changes in cased gasoline, U. S. Motor being quoted at $1.85 and 64-66, 375 end point at $2.00. Kerosene in cases, for which there has been very little spot demand, was unchanged at $1.80 for water white and $1.70 cents for prime white.

Gas oils at the Gulf were slightly easier but there was no reduction in quotations. The majority of suppliers were asking from 4 to 4.25 cents for low sulfur material. An Eastern seaboard refiner seeking quotations from the Gulf for its foreign subsidiary was quoted 3.625 cents for approximately 25,000 barrels for January shipment.

Wax Markets

Crude Scale Down 0.125 Cent

NEW YORK, Dec. 7.—The steadily diminishing demand for scale waxes resulted in further reductions in prices the past week. The market was fairly active as far as inquiries were concerned but sales were few. Fully refined grades were unchanged both in price and demand.

Scale goods were quoted from 3 to 3.125 cents generally, and were freely offered at the higher quotation. Some suppliers were asking a slightly higher price but they were in the minority. The low quotation applied to both white and yellow goods.

Several sellers reported they had received numerous inquiries from abroad but few resulted in business. One seller was asked for quotations on two different orders for French accounts but was unable to bid for the business. Both buyers were seeking 100 tons of white crude scale for prompt shipment.

Small sales of white crude scale were made both from New York and the Gulf at 3 cents. Virtually all shipments of yellow crude scale applied on contracts and the current market was largely one of quotation.

One seller reported a fair demand from the Far East for match wax, goods ranging from 108 to 112 A.m.p. on which there is no import duty in China.

Fully refined waxes were very quiet. A resale agent reported he was in a position to sell 123-125 A.m.p. fully refined over the first four months of next year at 4 cents. There were approximately 400 tons offered at this price, he said.

A number of the trade do not look for any material change in prices until well after the first of the year. Judging from the increase in stocks and production in October, as reported by the Bureau of Mines, some believed there might be a slight decline from present levels; others felt the market was at bottom believing that refiners would refuse to accept lower prices. The majority were of the opinion that prices would be higher after the first of the year.

Correction

On page 130, in the refinery market table of the Dec. 4 issue of NATIONAL PETROLEUM NEWS, the price of North Texas Grade C natural gasoline was published at 6.25 cents, as of Dec. 2. Correct price on that date was 6.125 to 6.25 cents.

On Nov. 25 correct price of North Louisiana 14-16 fuel oil was $0.75 to $0.85 per barrel, and of Arkansas 14-16 fuel oil, $0.675 to $0.825 per barrel.

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Complete Seaboard Market

(Export Markets for whole year given in OIL PRICE HANDBOOK. Each volume carries refinery, tank wagon, crude and export markets—complete for the whole year)

Eastern Domestic Market

(Prices for tank car lots, f. o. b. refinery or seaboard terminal, representing majority of quotations.)

U. S. MOTOR GASOLINE	Dec. 9	Dec. 2	Nov. 25
New York harbor	8.75	8.75	8.75
Portland district	*10.75	*10.75	*10.75
Boston district	*10.25	*10.25	*10.25
Providence district	*10.25	*10.25	*10.25
Philadelphia district	8.75 – 9.00	8.75 – 9.00	8.75 – 9.00
Baltimore district	9.00	9.00	9.00
Norfolk district	9.00	9.00	9.00
Charleston district	9.00	9.00	9.00
Savannah district	9.00	9.00	9.00
Jacksonville district	9.00	9.00	9.00
CALIFORNIA, U. S. MOTOR GASOLINE			
New York harbor	9.00	9.00	9.00
Philadelphia district	9.00	9.00	9.00
Baltimore district	9.00	9.00	9.00
WATER WHITE KEROSENE			
New York harbor	7.75	7.75	7.75
Philadelphia district	7.75 – 8.00	7.75 – 8.00	7.75 – 8.00
Baltimore district	7.75	7.75	7.75
GAS OIL: 28-34 Gravity			
New York harbor	4.75 – 5.00	4.75	4.75
Boston district	4.75 – 5.25	4.75 – 5.00	4.75 – 5.00
FURNACE OIL: 36-40 Gravity			
New York harbor	6.00 – 6.25	6.00 – 6.50	6.00 – 6.50
Boston district	6.00 – 6.25	6.00 – 6.50	6.00 – 6.50
GRADE C BUNKER OIL†			
New York Harbor	$1.05	$1.05	$1.05
Boston district	$1.05	$1.05	$1.05
DIESEL OIL			
New York harbor	$2.00 –$2.10	$2.00 –$2.10	$2.00 –$2.10
MEDICINAL OILS, RUSSIAN			
.885-890 s.g. 320-330 vis.	$0.82 –$0.97	$0.82 –$0.97	$0.82 –$0.97
.870-875 s.g. 145-155 vis.	$0.74 –$0.89	$0.74 –$0.89	$0.74 –$0.89

Note: Above gasoline prices do not include inspection tax levied in some states. *Minimum delivered. †Lighterage 5c per bbl. additional.

New York Export Market

(Lubricating oils are per gal. in bbls.)

	Dec. 9	Dec. 2	Nov. 25
CYLINDER OILS (Pennsylvania Products)			
Bright stock, dark	51.00 –53.00	53.00 –55.00	53.00 –55.00
600 D filtered	44.00 –45.00	43.00 –45.00	42.00 –45.00
600 Warren E filtered	38.00 –41.00	38.00 –41.00	38.00 –41.00
600 s.r. unfiltered	33.00 –35.00	33.00 –35.00	33.00 –35.00
650 s.r. unfiltered	38.00 –40.00	38.00 –40.00	38.00 –40.00
600 flash, s.r.	40.00 –42.00	40.00 –42.00	40.00 –42.00
630 flash, s.r.	43.00 –45.00	43.00 –46.00	44.00 –46.00
RED ENGINE OILS (Vis. 100°)			
300 vis. No. 6½ color	20.00 –21.00	20.00 –21.00	20.00 –21.00
250 vis. No. 6 color	18.00 –20.00	18.00 –20.00	18.00 –20.00
200 vis. No. 6 color	16.00 –17.00	16.00 –17.00	16.00 –17.00
PALE ENGINE OILS (Vis. 100°)			
230 vis. No. 3¾ color	22.00 –24.00	22.00 –24.00	22.00 –24.00
180 vis. No. 3¼ color	18.00 –20.00	18.00 –20.00	18.00 –20.00
100 vis. No. 2¼ color	16.00	16.00	16.00
MOTOR OILS (Vis. 100°)			
600 vis. No. 7 color	30.00 –32.00	30.00 –32.00	30.00 –32.00
500 vis. No. 6½ color	28.00 –29.00	28.00 –29.00	28.00 –29.00
400 vis. No. 7¼ color	26.00 –27.00	26.00 –27.00	26.00 –27.00
300 vis. No. 6 color	23.00 –24.00	23.00 –24.00	23.00 –24.00
200 vis. No. 6 color	21.00 –22.00	21.00 –22.00	21.00 –22.00
MEDICINAL OILS			
.875-880 s.g.	$0.76 –$0.91	$0.76 –$0.91	$0.76 –$0.91
.860-.865 s.g.	$0.58 –$0.73	$0.58 –$0.73	$0.58 –$0.73
WAXES (In cents per pound, f.a.s. carload lots)			
WHITE CRUDE SCALE (In barrels)			
122-124 A.m.p.	3.00 – 3.125	3.125– 3.25	3.125– 3.375
124-126 A.m.p.	3.00 – 3.125	3.125– 3.25	3.125– 3.375
FULLY REFINED (In burlap bags)			
123-125 A.m.p. Phila.	4.125– 4.25	4.125– 4.25	4.125– 4.25
125-127 A.m.p.	4.25 – 4.375	4.25 – 4.375	4.25 – 4.375
128-130 A.m.p.	4.50 – 4.625	4.50 – 4.625	4.50 – 4.625
130-132 A.m.p.	5.00 – 5.25	5.00 – 5.25	5.00 – 5.25
133-135 A.m.p.	5.75 – 6.00	5.75 – 6.00	5.75 – 6.00
135-137 A.m.p.	6.25 – 6.375	6.25 – 6.375	6.25 – 6.375
YELLOW CRUDE SCALE			
124-126 A.m.p.	3.00	3.00 – 3.125	3.00 – 3.125

Gulf Export Market

(Prices are f. o. b. Gulf oil terminals in Texas and Louisiana, shipments of 20,000 bbls. or more unless otherwise noted and for export shipment only).

GASOLINE	Dec. 9	Dec. 2	Nov. 25
U. S. Motor	8.50	8.50	8.50
60-62, 400 e.p.	9.50	9.50	9.50
61-63, 390 e.p.	9.75	9.75	9.75
64-66, 375 e.p.	10.00	10.00	10.00
U. S. Motor, cases (cargoes)	$1.85	$1.85	$1.85
64-66, cases (cargoes)	$2.00	$2.00	$2.00
KEROSENE			
44 water white	8.00	8.00	8.00
41-43 prime white	7.00	7.00	7.00
Water white, cases (cargoes)	$1.80	$1.80	$1.80
Prime white, cases (cargoes)	$1.70	$1.70	$1.70
DOMESTIC GAS & BUNKER OILS			
*26-30 translucent gas oil	4.00	4.00	4.00
*30 plus translucent gas oil	4.00 – 4.25	4.00 – 4.25	4.00 – 4.25
Grade C bunker oil	$0.95	$0.95	$0.95
Grade C bunker oil, cargoes	$0.70 –$0.75	$0.70 –$0.75	$0.70 –$0.75
*Less than ½ of 1% sulphur.			
MEXICAN CRUDE AND BUNKER OILS (F. O. B. Steamer, Tampico)			
Heavy Panuco crude taxes to be paid	$0.65 –$0.70	$0.60 –$0.65	$0.60 –$0.65
Grade C bunker oil for bunkering purposes, taxes paid	$0.90 –$0.95	$0.90 –$0.95	$0.90 –$0.95
SOUTH TEXAS LUBRICATING OILS (Viscosity at 100°F. cold test 0. Tanker, f. o. b. Houston)			
100 vis. No. 2 unfiltered pale	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50
200 vis. No. 3 unfiltered pale	8.25 – 9.00	8.25 – 9.00	8.25 – 9.00
300 vis. No. 3 unfiltered pale	9.75 –10.00	9.75 –10.00	9.75 –10.00
500 vis. No. 3½ unfiltered pale	11.25 –11.50	11.25 –11.50	11.25 –11.50
750 vis. No. 4 unfiltered pale	12.50 –13.00	12.50 –13.00	12.50 –13.00
1200 vis. No. 5 unfiltered pale	16.25 –16.50	16.25 –16.50	16.25 –16.50
200 vis. No. 5-6 red oil	7.00 – 8.00	7.00 – 8.00	7.00 – 8.00
300 vis. No. 5-6 red oil	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
500 vis. No. 5-6 red oil	9.25 –10.00	9.25 –10.00	9.25 –10.00
750 vis. No. 5-6 red oil	11.00 –12.00	11.00 –12.00	11.00 –12.00
1200 vis. No. 5-6 red oil	15.00 –16.00	15.00 –16.00	15.00 –16.00

Gulf Domestic Market

(Prices are f.o.b. Gulf oil terminals in Texas and Louisiana in shipments of 20,000 bbls. or more, representing sellers' opinions, for domestic shipment only).

	Dec. 9	Dec. 2	Nov. 25
U. S. Motor gasoline	7.50	7.50	7.50
41-43 w.w. kerosene	6.375– 6.50	6.375– 6.50	6.375– 6.50
*26-32 translucent gas oil	4.00 – 4.125	4.00 – 4.125	4.00 – 4.125
*Less than ½ of 1% sulphur.			

Pacific Export Market

(Quotations are at seaboard, Los Angeles, in cargo lots, cents per gallon, except where otherwise noted.)

	Dec. 9	Dec. 2	Nov. 25
Gasoline, U. S. Motor, 53-55 Gravity	6.25 – 7.00	6.25 – 7.00	6.25 – 7.00
Gasoline, U. S. Motor-blends and special cuts	7.25 –10.00	7.25 –10.00	7.25 –10.00
Gas Oil, 30-34, per barrel	$0.85 –$1.00	$0.80 –$1.00	$0.80 –$1.00
Diesel Oil, 27 plus, per barrel	$0.80 –$1.00	$0.80 –$1.00	$0.80 –$1.00
Bunker oil, 14-18, per barrel	$0.65 –$0.85	$0.70 –$0.85	$0.70 –$0.85
Fuel oil, 14-18 per barrel	$0.60 –$0.85	$0.60 –$0.85	$0.60 –$0.85
Kerosene, 38-40 w.w., 125-150 flash, per gal.	5.75 – 6.25	5.50 – 6.25	5.50 – 6.25
Cased Goods			
Gasoline, U. S. Motor	$1.75 –$1.85	$1.75 –$1.85	$1.75 –$1.85
Kerosene, 38-40 w.w., 125, 150 flash	$1.45 –$1.50	$1.45 –$1.50	$1.45 –$1.50

Tanker Rates

(Approximate tanker freight rates to Continental ports, in shillings per ton of 2240 pounds, British sterling; to American ports, cents per barrel.)

	Dec. 9 Crude & /or Fuel	Refined Oil &/or Spirits
Calif. to U. K. or Continental ports*	33-35	43-45
Gulf to U. K. or Continental ports*	23-25	30
North Atlantic to U. K. or Continental ports*	21-23	27
Calif. to North Atlantic ports (not E. of N. Y.)	$0.90-$0.95	$1.05
Gulf to North Atlantic ports (not E. of N. Y.)**	30–35	41-43

*Continental ports in the range between Bordeaux and Hamburg, both inclusive.

**Venezuela loading same rate. For Tampico 3c per bbl. additional.

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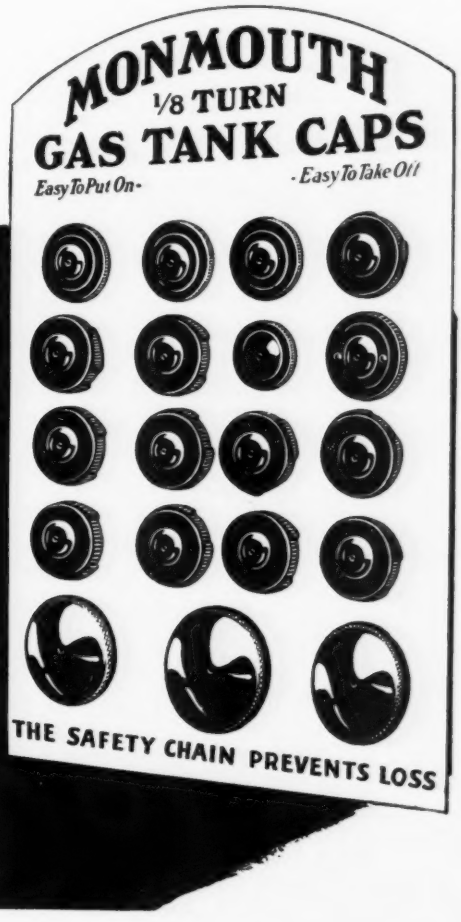

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Tank Wagon Service Station Markets for Gasoline and Kerosene

(OIL PRICE HANDBOOK has t. w. and s. s. markets for a whole year, arranged for quick reference)

These Prices in Effect Dec. 9, 1929, as Posted by Principal Marketing Companies

S.O. NEW JERSEY TERRITORY

	Gasoline Total				Oil
	T.W.	Tax	T.W.	S.S.	T.W.
Atlantic City, N. J.	14	2	16	18	13
Newark, N. J.	15	2	17	19	13
Annapolis, Md.	15	4	19	21	13
Baltimore, Md.	15	4	19	21	12
Cumberland, Md.	16	4	20	22	13
Washington, D. C.	15	2	17	19	12
Danville, Va.	16	5	21	23	12
Norfolk, Va.	15	5	20	22	12
Richmond, Va.	15	5	20	22	13
Roanoke, Va.	16	5	21	23	13
Petersburg, Va.	16	5	21	23	13
Charleston, W. Va.	15	4	19	21	13
Keyser, W. Va.	16	4	20	22	13
Parkersburg, W. Va.	15	4	19	21	12
Wheeling, W. Va.	16	4	20	22	13
Charlotte, N. C.	14	5	19	21	13
Hickory, N. C.	16	5	21	23	13
Mt. Airy, N. C.	16	5	21	23	13
Salisbury, N. C.	14	5	19	21	13
Charleston, S. C.	15	6	21	23	13
Columbia, S. C.	16	6	22	24	13

Note: 2c per gallon discount off t.w. price of gasoline to dealers and commercial consumers thru S. O. New Jersey territory.

CONTINENTAL OIL

Denver, Colo.	14	4	18	21	15.5
Pueblo, Colo.	14	4	18	21	15.5
Grand Junc., Colo.	18.5	4	22.5	25.5	19
Casper, Wyo.	16	4	20	23	14
Cheyenne, Wyo.	17	4	21	24	15.5
Butte, Mont.	20.5	5	25.5	28.5	20
Helena, Mont.	20.5	5	25.5	28.5	20
Salt Lake City, Utah	17.5	3½	21	21	17
Boise, Ida.	19.5	4	23.5	26.5	19
Twin Falls, Ida.	19.5	4	23.5	27.5	19
Albuquerque, N. M.	15	5	20	22	17

S. O. CALIFORNIA

Phoenix, Ariz.	14	4	18	22	20
Los Angeles, Cal.	16.5	3	19.5	22.5	15.5
Fresno, Cal.	17	3	20	23	17
San Francisco, Cal.	17	3	20	23	15.5
Reno, Nev.	21	4	25	28	19
Portland, Ore.	17.5	3	20.5	23.5	16.5
Seattle, Wash.	17.5	3	20.5	23.5	16.5
Spokane, Wash.	21.5	3	24.5	27.5	20.5
Tacoma, Wash.	17.5	3	20.5	23.5	16.5

Note: 4c per gal. discount to dealers off t.w. price of gasoline to customers taking tank truck delivery, thru S. O. California territory except 1c discount at Phoenix to dealers only.

S. O. LOUISIANA

Little Rock, Ark.	14	5	19	21	13
Alexandria, La.	‡15	4	‡19	21	†16
Baton Rouge, La.	14	4	18	20	†14.5
Lake Charles, La.	††16.5	4	††20.5	††22.5	†16
New Orleans, La.	*11	4	*15	15	†13
Shreveport, La.	15.5	4	19.5	21.5	†15
Lafayette, La.	**16	4	**20	**22	†14
Bristol, Tenn.	16	5	21	22	14
Chattanooga, Tenn.	15	5	20	22	14
Knoxville, Tenn.	15	5	20	22	16
Nashville, Tenn.	14	5	19	19	16
Memphis, Tenn.	15	5	20	22	12.5

Note: 2c per gallon discount off t.w. price of gasoline to dealers thru S. O. Louisiana territory.

*New Orleans gasoline prices include 1c parish tax in addition to 4c state tax, and kerosene prices include 1c state tax and 1c parish tax.

†Kerosene price in Louisiana includes 1c state tax.

**Lafayette gasoline prices include 1c parish tax in addition to 4c state tax.

††Lake Charles gasoline prices include 1c parish tax.

‡Alexandria gasoline prices include 1c parish tax.

S. O. KENTUCKY

Ashland, Ky.	15	5	20	21	15.5
Catlettsburg, Ky.	15	5	20	21	15.5
Lexington, Ky.	15	5	20	22	15.5
Louisville, Ky.	16	5	21	23	13
Covington, Ky.	15	5	20	21	15.5
Clarksdale, Miss.	13	5	18	20	12.5
Gulfport, Miss.††	17.5	5	22.5	24.5	14
Jackson, Miss.	14	5	19	21	13
Natchez, Miss.	15.5	5	20.5	20.5	14
Vicksburg, Miss.	15.5	5	20.5	22.5	14
Birmingham, Ala.	13	4	17	19	13
Mobile, Ala.‡	14	4	18	20	15
Montgomery, Ala.*	15	4	19	21	16.5
Atlanta, Ga.	14	6	20	22	†16.5
Augusta, Ga.	12	6	18	20	†15.5
Macon, Ga.	15	6	21	23	†16.5
Savannah, Ga.	16	6	22	24	†15.5
Jacksonville, Fla.	16	6	22	24	14.5
Miami, Fla.	17	6	23	25	15.5
Tampa, Fla.	14	6	20	22	14.5
Pensacola, Fla.**	12	6	18	20	14.5

Note: Net price of gasoline to dealers is 2c under posted t.w. price thru S. O. Kentucky territory.

*Local privilege tax of 1 cent on gasoline and ½ cent on kerosene at Montgomery included. ‡Mobile gasoline prices include 1c city tax

†Georgia kerosene prices include 1c state tax.

**Both tank wagon prices include 1c city tax at Pensacola which went into effect Oct. 15, 1926.

††Both tank wagon prices at Gulfport include Harrison county privilege tax of 2c.

Latest Changes in Tank Wagon Prices

Gasoline Changes

S. O. Ohio—T.w. and s.s. gasoline cut 1c generally through Ohio, making state wide schedule 18c t.w. and 19c s.s., including 4c tax, Sunday, **Dec. 8.** Last previous general change in Ohio was 1c cut on **July 26.**

T.w. cut 2c, s.s. cut 3c. Hancock county, both to 17c, including tax, **Dec. 8.**

S. O. Kentucky—T.w. and s.s. cut 2c, Augusta, to 18c and 20c respectively, including 6c tax, **Nov. 28.**

T.w. and s.s. up 2c, Ashland and Catlettsburg, both 20c and 21c respectively, including 5c tax **Dec. 3.**

S.s. cut 2c, Jackson, to 21c, **Dec. 1**; t.w. cut 2c to 19c, **Dec. 2.**

T.w. and s.s. gasoline cut 2c, Tampa, to 20c and 22c respectively, **Dec. 3.**

Continental Oil—S.s. only cut 1c, Albuquerque, to 22c, **Dec. 3.**

Canada—T.w. and s.s. up 3c, Ottawa, to 24.5c and 28c respectively, including 5c tax, **Nov 25.**

Kerosene Changes

S. O. Ohio—Kerosene cut 1c generally through Ohio to 12c t.w., **Dec. 8.**

Magnolia Petroleum—Kerosene cut 3c, Muskogee, to 10c t.w., **Dec. 3.**

Cut 1c, Dallas, to 12c, **Nov. 21.**

S. O. NEBRASKA

Omaha, Neb.	16.25	4	20.25	22.25	13.25
McCook	17.75	4	21.75	23.75	14.75
Norfolk	16.75	4	20.75	22.75	13.75
North Platte	17.75	4	21.75	23.75	14.50
Scottsbluff	17.75	4	21.75	23.75	14.25

S. O. INDIANA

Chicago, Ill.	14	3	17	18	13
Decatur, Ill.	16.2	3	19.2	20.2	13.1
E. St. Louis, Ill.	12.4	3	15.4	15.4	12.2
Joliet, Ill.	16.4	3	19.4	20.4	13.3
Peoria, Ill.	16.2	3	19.2	20.2	13.1
Quincy, Ill.	16.2	3	19.2	20.2	12.9
Indianapolis, Ind.	16.2	4	20.2	21.2	14.2
Evansville, Ind.	16	4	20	21	14
South Bend, Ind.	16.4	4	20.4	21.4	14.4
Detroit, Mich.	16.8	3	19.8	20.8	14.7
Grand Rapids, Mich.	16.7	3	19.7	20.7	14.6
Saginaw, Mich.	16.9	3	19.9	20.9	14.8
Green Bay, Wisc.	16.6	2	18.6	19.6	13.4
Madison, Wisc.	16.3	2	18.3	19.3	13.1
Milwaukee, Wisc.	16.1	2	18.1	19.1	12.9
La Cross, Wisc.	17.2	2	19.2	20.2	14
Minneapolis, Minn.	17.2	3	20.2	21.2	13.9
Duluth, Minn.	17.5	3	20.5	21.5	13.9
Mankato, Minn.	17.1	3	20.1	21.1	13.7
Des Moines, Ia.	16.5	3	19.5	20.5	13.3
Davenport, Ia.	16.5	3	19.5	20.5	13.3
Sioux City, Ia.	16.1	3	19.1	20.1	12.9
Mason City, Ia.	16.5	3	19.5	20.5	13.3
St. Louis, Mo.	*15.9	2	17.9	18.9	12.3
Kansas City, Mo.	†16.9	2	18.9	19.9	11.6
St. Joseph, Mo.	†16.5	2	18.5	19.5	12.2
Fargo, N. D.	18.9	3	21.9	22.9	15.9
Grand Forks, N. D.	19.2	3	22.2	23.2	16.2
Minot, N. D.	18.9	3	21.9	22.9	15.9
Pierre, S. D.	17	4	21	22	14.4
Huron, S. D.	17.3	4	21.3	22.3	14.7
Wichita, Kans.	14.8	3	17.8	18.8	11.8
Bartlesville, Okla.	14.5	4	18.5	19.5	11.5

S. O. Indiana's quantity contract price schedule thru territory except Chicago on tank truck deliveries of gasoline, figured from the service station price, is 2c for 500 gals. or more a month; 2½c for 2000 gals. or more a month and 3c for 6000 gals. or more a month.

In Chicago and vicinity, these discounts apply. Over 500 gals. per month, 2c per gal. off service station price; over 1,000 gals. per month, 4c per gal. off service station price.

*Includes city tax of ½c

†Includes city tax of 1c.

S. O. OHIO

Ohio state-wide	14	4	18	19	12
Columbiana, Meigs, Washington, Mercer, Stark, Gallia, Darke and Hancock Counties:	13	4	17	17	12

Note: Discount to dealers and commercial accounts generally thru Ohio is 2c per gal. off t.w. price with some exceptions. In 8 counties mentioned above, discount is 3c per gal. off t.w. price.

MAGNOLIA PETROLEUM

Muskogee, Okla.	12	4	16	19	10
Oklahoma City.	13	4	17	20	10
Tulsa, Okla.	11	4	15	19	10
Fort Smith, Ark.†	11	†4	15	17	12
Little Rock, Ark.	14	5	19	21	13
Texarkana, Ark.*	13	*4	17	19	12
Dallas, Tex.	13	4	17	21	12
Fort Worth, Tex.	13	4	17	20	12
Houston, Tex.	9	4	13	17	11
San Antonio, Tex.	11	4	15	19	11
El Paso, Tex.	12	4	16	20	16

*Within city of Texarkana, the state tax on gasoline is 4c per gal. conforming with the Texas state tax. In this district outside of the city the 5c Arkansas tax applies.

†Within city of Fort Smith, Oklahoma tax of 4c applies. In this district outside of the city, the 5c Arkansas tax applies.

S. O. NEW YORK

Due to local price conditions at many points in S. O. New York territory, actual prices on both gasoline and kerosene are being made at under the posted tank wagon prices published below.

Greater New York City: Boroughs of Manhattan, Bronx, Queens & Kings.	14	2	16	18	15
Borough of Richmond.	15	2	17	19	15
Albany, N. Y.	16	2	18	20	15
Buffalo, N. Y.	14	2	16	18	14
Rochester, N. Y.	14	2	16	18	13
Syracuse, N. Y.	16	2	18	20	15
Boston, Mass.	16	2	18	20	15
Augusta, Me.	16	4	20	20	15
Manchester, N. H.	16	4	20	22	15
Burlington, Vt.	16	4	20	22	15

Note: S. O. New York allows concessions of 1 to 2c per gal. to dealers under posted tank wagon prices.

*The Standard of New York does not operate stations in New York City. This figure is the retail price of a principal station operator in New York selling Socony gasoline.

Above prices include these inspection fees on both gasoline and kerosene, per gallon: Alabama, 1/40c on gasoline, 1/2c kerosene; Arkansas, 1/20c on both; Florida, 1/8c on both; Georgia, 1/10c on both; Indiana, 4/25c to 1/2c on both; Kansas, 3/50c on both; Louisiana, 1/32c on gasoline; Minnesota, 3/50c on both; Missouri, 3/10c to 1/2c on both; Nebraska, 3/50c to 1/2c on both; North Carolina, 1/4c on both; North Dakota, 1/20c on both; Oklahoma, 4/25c on both; South Carolina, 1/8c on both; South Dakota, 1/10c on both; Tennessee, 2/5c on gasoline and 1/2c to 4/5c on kerosene; Wisconsin, 3/50c on both.

Kerosene inspection fees only, per gallon; Iowa, 7/100c; Michigan 1/5c to 4/5c per gal.

In Illinois, cities and villages have the power to appoint oil inspectors and fix inspection fees which is done in some instances. In some cases in the above state or other states there are local inspection fees.

Tank Wagon, Service Station Markets for Gasoline and Kerosene

Prices in Effect Dec. 9, 1929

ATLANTIC REFINING

	Gasoline T.W.	Tax	Total T.W.	S.S.	Oil T.W
Pittsburgh, Pa.	15	*	15	21	13
Philadelphia, Pa.	15	*	15	21	13
Allentown, Pa.	15	*	15	21	13
Erie, Pa.	15	*	15	19	13
Scranton, Pa.	15	*	15	21	13
Altoona, Pa.	15	*	15	21	13
Williamsport, Pa.	14	*	14	18	13
Dover, Del.	15	3	18	20	13
Wilmington, Del.	15	3	18	20	13
Boston, Mass.	16	2	18	20	15
Springfield, Mass.	16	2	18	20	15
Worcester, Mass.	16	2	18	20	15
Fall River, Mass.	16	2	18	20	13
Providence, R. I.	16	2	18	20	13
Hartford, Conn.	16	2	18	20	15
New Haven, Conn.	16	2	18	20	15
Atlantic City, N. J.	14	2	16	18	13
Camden, N. J.	15	2	17	19	13
Trenton, N. J.	15	2	17	19	13
Annapolis, Md.	16	4	20	22	13
Baltimore, Md.	15	4	19	21	12
Hagerstown, Md.	14	4	18	18	12
Richmond, Va.	15	5	20	22	13
Wilmington, N. C.	15	5	20	22	13
Brunswick, Ga.	16	6	22	24	**16.5
Jacksonville, Fla.	16	6	22	24	14.5

Note: 2c per gal. discount off t.w. price of gasoline on sales to dealers; discount to commercial accounts under contract for one year in accordance with Code of Ethics.

*4-cent state tax is collected by retail dealer and paid by him directly to state.

**Georgia kerosene prices include 1c state tax.

V. M. & P. NAPHTHA

(Changes ordinarily occur coincident with gasoline price changes)

	Oleum Spirits	V.M.&P. Naphtha	Cleaner Naphtha
Chicago	15.7	17.2	19
Detroit	17.4	18.9	20.7
Kansas City	†15.9	†17.4	†19.2
Milwaukee	16.4	*19.9	*21.7
Minneapolis	**19.7	**21.2	*23
St. Louis	15.6	17.1	18.9
New York		16	23
Boston		19	23

*Includes 2c state tax. †Includes 1c city tax.
**Includes 3c state tax.

Petroleum Spirits

	(Solvent)
Tank Cars	
New York refineries	11.50–12.00
Philadelphia refineries	11.50–12.00
Tank Wagon or Steel Barrels	
New York City	16–18
New England	18–19
New Jersey	16–18
Pennsylvania	16–19

Note: 2c off above t.w. prices to large buyers in some instances.

CANADA

(Per Imperial Gallon, which is 1.2 American Gallons)

	Gasoline T.W.	Tax	Total T.W.	S.S.	Oil T.W.
ONTARIO					
Toronto	19.5	5	24.5	28	20.5
Ottawa	19.5	5	24.5	28	20.5
Cochrane	24.5	5	29.5	..	25.5
Ft. William	22.5	5	27.5	31	22.5
Border Cities, including Windsor	18.5	5	23.5	27	19.5
MANITOBA					
Winnipeg	21.5	3	24.5	28	21.5
SASKATCHEWAN					
Regina	26	3	29	33	26
ALBERTA					
Edmonton	27.5	5	32.5	36	27.5
Calgary	23.5	5	28.5	32	23.5
BRITISH COLUMBIA					
Vancouver	23	3	26	30	24
QUEBEC					
Montreal	20.5	5	25.5	29	21.5
Quebec City	21.5	5	26.5	30	22.5
Three Rivers	21.5	5	26.5	30	22.5
NEW BRUNSWICK					
St. John	22	5	27	31	24
Moncton	22	5	27	31	24
NOVA SCOTIA					
Halifax	22	5	27	31	24
Sydney	22	5	27	31	24
PRINCE EDWARD ISLAND					
Charlottetown	22	5	27	31	24

Note: In districts surrounding these points 1c additional is added to city price.

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Crude Oil Prices (in Effect Dec. 9, 1929)

(Crude prices for the whole year in OIL PRICE HANDBOOK published annually)

EASTERN FIELDS

(All Penna. Crude prices effective Oct. 1, 1929)

(Posted by Joseph Seep Purchasing Agency)

Penna. Grade Oil in New York Transit Lines (Alleghany, N. Y. District) *$3.05

Bradford District Oil in National Transit Lines (Bradford District) *3.05

Penna. Grade Oil in National Transit Lines (Other Pennsylvania) *3.05

Penna. Grade Oil in Southwest Penna. Pipe Lines (Other Pennsylvania) 3.00

Penna. Grade Oil in Eureka Pipe Lines (West Virginia) 2.90

Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O. district) 2.70

Wayne district crude in Cumberland lines (West Virginia) $1.42

Corning Grade in Buckeye Pipe Lines (Ohio) (Effective Dec. 6, 1929) 1.80

Corning, O., heavy grade (Effective Dec. 6, 1929) 1.70

Somerset Oil in Cumberland Pipe Lines (Kentucky) (Effective Nov. 12, 1929) 1.55

Somerset Oil in Eureka Pipe Lines (Effective Nov. 12, 1929) 1.29

Ragland Grade in Cumberland Pipe Lines (Kentucky) (Effective Jan. 29, 1929) $0.60

***Oil run prior to July 1, 1929 is $3.00 per bbl.**

(Posted by Stoll Oil Refining Co.)

Oil City, Ky., oil in Stoll lines (Effective Oct. 7, 1929) $1.70

MICHIGAN

(Posted by Dixie Oil Co.)

Traverse and Dundee (Muskegon):

32-32.9	$1.25	39-39.9	$1.60
33-33.9	1.30	40-40.9	1.65
34-34.9	1.35	41-41.9	1.70
35-35.9	1.40	42-42.9	1.75
36-36.9	1.45	43-43.9	1.80
37-37.9	1.50	44 and above	1.85
38-38.9	1.55		

(Posted by Pure Oil Co.)

Midland, Midland County $1.50

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

Effective May 21, 1929

Wooster	$1.90	Princeton	$1.75
Lima	1.80	Illinois	1.75
Waterloo	1.20	Plymouth	1.28
Indiana	1.57	West Kentucky	1.68

CANADIAN CRUDE

Posted by Imperial Oil Refineries, Ltd.

Petrolia $2.20

Oil Springs 2.27

OKLAHOMA, KANSAS and NORTH TEXAS

Prices of Paririe Oil & Gas Co.

(In Oklahoma, Kansas; North and East Central Texas)

Effective May 20, 1929

Below 25	$0.85	35-35.9	$1.40
25-25.9	0.90	36-36.9	1.45
26-26.9	0.95	37-37.9	1.50
27-27.9	1.00	38-38.9	1.55
28-28.9	1.05	39-39.9	1.60
29-29.9	1.10	40-40.9	1.65
30-30.9	1.15	41-41.9	1.70
31-31.9	1.20	42-42.9	1.75
32-32.9	1.25	43-43.9	1.80
33-33.9	1.30	44 and above	1.85
34-34.9	1.35		

Humble Oil & Refining Co. Prices

(Ranger, North Texas, Mexia, Powell, Boggy Creek, Richland, Wortham, Lytton Springs, Currie, Moran and Nocona crudes all in Texas.)

May 20, 1929, same schedule as Prairie in above fields.

Magnolia Petroleum Co.

(In Oklahoma, Kansas and North and East Central Texas)

May 20, 1929, Magnolia posted in above fields and in Panola Co., same schedule as Prairie, except these grades:

Below 26	$0.70	29-29.9	0.95
26-26.9	0.75	30-30.9	1.05
27-27.9	0.85	31-31.9	1.15
28-28.9	0.90		

May 20, 1929, Glasscock, Crane, Upton, Winkler, Howard and Mitchell Counties same prices as Humble's postings in West Texas which see.

Iatan district	$0.93
Corsicana heavy	0.80
Luling	0.90
Mirando	0.90

Carter Oil Co.

(Oklahoma and Kansas)

May 20, 1929, same schedule as Prairie except Carter does not post oil below 25.

PANHANDLE, TEXAS

Humble Oil & Refining Co.

Effective May 20, 1929

Hutchinson and Carson Counties:

Below 32	$0.90	38-38.9	$1.25
32-32.9	0.95	39-39.9	1.30
33-33.9	1.00	40-40.9	1.35
34-34.9	1.05	41-41.9	1.40
35-35.9	1.10	42-42.9	1.45
36-36.9	1.15	43-43.9	1.50
37-37.9	1.20	44 and above	1.55

Wheeler County:

Below 30	$0.90	37-37.9	$1.30
30-30.9	0.95	38-38.9	1.35
31-31.9	1.00	39-39.9	1.40
32-32.9	1.05	40-40.9	1.45
33-33.9	1.10	41-41.9	1.50
34-34.9	1.15	42-42.9	1.55
35-35.9	1.20	43-43.9	1.60
36-36.9	1.25	44 and above	1.65

Gray County:

Below 29	$0.90	37-37.9	$1.35
29-29.9	0.95	38-38.9	1.40
30-30.9	1.00	39-39.9	1.45
31-31.9	1.05	40-40.9	1.50
32-32.9	1.10	41-41.9	1.55
33-33.9	1.15	42-42.9	1.60
34-34.9	1.20	43-43.9	1.65
35-35.9	1.25	44 and above	1.70
36-36.9	1.30		

Above prices met by The Texas Co. and Magnolia on May 20.

WEST TEXAS

Humble Oil & Refining Co.

Effective May 20, 1929

Winkler, Crane, Upton, Crockett, and Pecos Counties, also Lea County, N. Mex.

Below 25	$0.70	31-31.9	0.98
25-25.9	$0.74	32-32.9	$1.02
26-26.9	$0.78	33-33.9	1.06
27-27.9	0.82	34-34.9	1.10
28-28.9	0.86	35-35.9	1.14
29-29.9	0.90	36 and above	1.18
30-30.9	0.94		

Howard and Glasscock counties:

Effective Nov. 27, 1929

Below 25	$0.70	31-31.9	$0.90
25-25.9	.74	32-32.9	.92
26-26.9	.78	33-33.9	.94
27-27.9	.82	34-34.9	.96
28-28.9	.84	35-35.9	.98
29-29.9	.86	36 and above	1.00
30-30.9	.88		

May 20, 1929, The Texas Co. posted same prices as Humble in Crane, Upton, Pecos and Winkler., and Magnolia in Crane, Upton, Winkler, Glasscock, Howard and Mitchell.

SOUTHWEST TEXAS

(Posted by Humble Oil & Refining Co.)

Effective May 20, 1929

Mirando	$0.90
Salt Flat	1.25

NORTH LOUISIANA—ARKANSAS FIELDS

Prices of Standard Oil Co. of Louisiana

Caddo, Homer, Haynesville, Bull Bayou, El Dorado, Crichton, De Soto and **Cotton Valley.

Effective May 22, 1929

Below 28	$1.00	36-36.9	$1.45
28-28.9	1.05	37-37.9	1.50
29-29.9	1.10	38-38.9	1.55
30-30.9	1.15	39-39.9	1.60
31-31.9	1.20	40-40.9	1.65
32-32.9	1.25	41-41.9	1.70
33-33.9	1.30	42-42.9	1.75
34-34.9	1.35	43-43.9	1.80
35-35.9	1.40	44 and above	1.85

**Cotton Valley, below 36, $0.85. Beginning with 36-36.9, same schedule as above.

Smackover, below 24			$0.85
do	24 and above		1.00
Bellevue			1.30
*Urania, La.			1.10
†East El Dorado			0.75

*Posted by Louisiana Oil Refining Corp.

†Posted by Magnolia Petroleum Co.

May 20, The Texas Co. same schedule in Louisiana as Standard, plus these grades: 24-24.9, $0.85; 25-25.9, $0.90; 26-26.9, $0.95; 27-27.9, $1.00.

May 22, Magnolia, Atlantic, Shreveport-Eldorado Pipe Line, Louisiana Oil, and Gulf Companies met Standard schedule in Louisiana-Arkansas fields.

STEPHENS, ARKANSAS

Louisiana Oil Refining Corp., and Atlantic Oil Producing Co.

Effective May 22, 1929

Below 28	$0.90	30-30.9	$1.02
28-28.9	0.94	31-31.9	1.06
29-29.9	0.98	32 and above	1.10

GULF COASTAL

Posted by Humble Oil & Refining Co.

Effective May 20, 1929

Grades A	$1.30	29-29.9	$1.30
Grades B:		30-30.9	1.33
Below 25	$1.15	31-31.9	1.36
25-25.9	1.18	32-32.9	1.39
26-26.9	1.21	33-33.9	1.42
27-27.9	1.24	34-34.9	1.45
28-28.9	1.27	35 and above	1.48

Fields classified as A and B are Spindletop, Goose Creek, Hull, Liberty, Sour Lake, West Columbia, Orange, Boling, Pierce Junction, Sugarland and Raccoon Bend. All other fields are Grades A only.

Crude Price Changes

OIL CITY—On Dec. 6 Joseph Seep Purchasing Agency reduced Corning, O. crude 10 cents, making new prices of medium grade $1.80 and of the heavy grade, $1.70 per barrel. Last previous change was an advance of 15 cents on May 22.

* * *

PITTSBURGH—On Dec. 6 Pure Oil Co. reduced Midland district, Mich. crude 20 cents, making new price $1.50 per barrel.

Tank Maker Represented In Venezuela

KANSAS CITY, Mo., Dec. 6.—Appointment of a sales representative in Venezuela by the Columbian Steel Tank Co. was announced recently to take care of growing demand for oil field equipment because of increasing development in that country.

P. H. Heeney, for 17 years in oil field construction work in Mexico, is the man chosen to represent the Columbian company in Venezuela. He will also represent the company in other South American countries producing oil.

RICHMOND, Va.—Collections from the gasoline tax in Georgia broke all records in October, when the tax collected totaled $1,175,501.62.

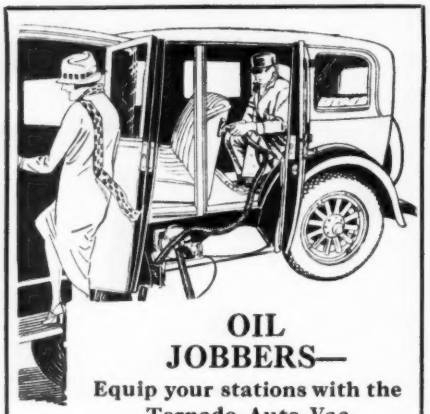
WAUKESHA, Wis.—Among the exhibitors at the 1930 automobile show in New York will be the Waukesha Motor Co.'s new Waukesha Dispatch Six, which has as one of its features a manifold permitting the engine to be run at a low idling speed for an hour or more and then to be picked up without bucking or irregularities. The engine also has the Waukesha patented Ricardo head, oil level equalizer, integral series type oil filter, and other new units.

C. A. Shepard Marries; On World Cruise

KANSAS CITY, Kan., Dec. 6.—C. A. Shepard, vice president of the Inter-State Oil Co. here, married Miss Irvine Scott, of Gainesville, Tex. on Nov. 23.

Mr. and Mrs. Shepard sailed Dec. 2 on the Empress of Australia on a round-the-world cruise. They will return to Kansas City about April 5, 1930, according to Roy Spear, sales manager.

RICHMOND, Va.—The largest shipment of gasoline ever sent to Cuba from Hampton Roads, Va., was in October, when 1,553,015 gallons were shipped.

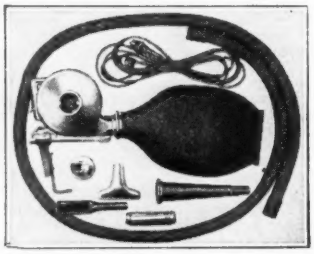


OIL JOBBERS—

Equip your stations with the Tornado Auto-Vac

Give your customers a 100 per cent vacuum cleaning job with the new TORNADO Auto-Vac Cleaner—the most powerful and efficient commercial auto cleaning device ever built. Hundreds of oil jobbers have standardized on the TORNADO—stimulates sales! Attach this advertisement to your letterhead and mail for special offer to oil jobbers. No obligation.

Breuer Electric Mfg. Co.
860 Blackhawk St., Chicago, Ill.



PETROLEUM PRODUCTS
From All Fields

Carloads, Tank Cars, and Cargoes
For Domestic or Export

GASOLINE KEROSENE NAPHTHA
CRUDE OIL FUEL OIL GAS OIL FURNACE OIL
CYLINDER STOCKS
UNFILTERED AND FILTERED
BRIGHT STOCKS
COLD SETTLED AND CENTRIFUGED
PALE—RED OILS
WAX—PETROLATUM
TECHNICAL WHITE OILS
WHITE MINERAL OILS

For 35 years of reliability, service and integrity—this Company enjoys an International Reputation

JAMES B. BERRY SONS' CO., INC.
General Office—Oil City, Pa.

District Offices at
New York, Philadelphia, Boston, Chicago
London—Hamburg

Cable Address—JASBER Oil City *All Codes*

TANKS, BARRELS, PUMPS, EQUIPMENT

THE following is a partial list of the products which we are regularly supplying to the oil trade. Do not hesitate to send us your inquiry on any special weight or out of the ordinary equipment or any other special steel plate construction:

Field Tanks, up to 55,000 barrels
Bulk Storage Tanks and equipment complete
Fuel Oil Tanks, all types and sizes
Truck Tanks, oval, round, square, or semi-rectangular
Fuel Oil Truck Tanks, insulated and with heating arrangement
Lubricating Oil Plants, including complete compounding equipment
Grease and Soap Kettles, steam jacketed, with air or mechanical agitator
Steel Drums, complete line
Rotary and Plunger Type Pumps, valves, and fittings

BROWN SHEET IRON & STEEL CO.

964 Berry Avenue **St. Paul, Minn.**

Tear off this Coupon and Mail it *Today*

Interested in.....

Size..... Truck.....

Other Equipment.....

Name.....

Address.....

Crude Oil Prices (in Effect Dec. 9, 1929)

(Crude Oil Prices for the whole year in OIL PRICE HANDBOOK published annually)

GULF COASTAL

Prices of The Texas Co.

Effective May 20, 1929

Grades A	$1.30	*Grades B	$1.15
‡Grades B (light crude):			
35–35.9	$1.49	40–40.9	$1.69
36–36.9	1.53	41–41.9	1.73
37–37.9	1.57	42–42.9	1.77
38–38.9	1.61	43–43.9	1.81
39–39.9	1.65	44 and above	1.85

*Grades B include all heavy crudes which do not meet tests for Grades A or for Gulf Coast light crude.

‡The Texas Co.'s gravity and price schedule on all oil below 35° is same as Humble's postings on Grades B.

ROCKY MOUNTAIN FIELDS

Prices of Ohio Oil Co., and Midwest Refining Co.

(Salt Creek prices effective May 20, 1929)

‡Salt Creek 29–29.9	$1.10
" " 30–30.9	1.15
" " 31–31.9	1.20
" " 32–32.9	1.25
" " 33–33.9	1.30
" " 34–34.9	1.35
" " 35–35.9	1.40
" " 36–36.9	1.45
" " 37 and above	1.50
Elk Basin	1.65
Grass Creek light	1.65
Bid Muddy	$1.43
Lance Creek	1.68
Rock Creek	1.40
Mule Creek	1.20
Rex Lake	1.10
‡Osage	1.65
‡Cat Creek, Mont.	1.65
Sunburst, Mont.	1.75
‡Hogback, N. Mex.	1.70
Artesia, N. Mex.	1.08

‡Posted by Midwest Refining Co. Midwest also buys Grass Creek light and Elk Basin.

CALIFORNIA

***Standard Oil Co. of California**

Gravity	Alamitos Heights Huntington Beach Signal Hill Seal Beach	Inglewood Torrance	Olinda-Brea Canon †Richfield	Athens-Rosecrans Dominguez	Elwood Terrace	Whittier La Habra	Coyote Hills	Santa Fe Springs	Newhall McKittrick Kern River	Midway Sunset Buena Vista & Elk Hills	Lost Hills	Coalinga	Wheeler Ridge	Montebello	Kettleman Hills	*Santa Maria (Orcutt)	*Ventura
14–14.9	$ .70	$ .70	$ .70	....	....	$ .70	$ .70	.....	$ .50	$ .50	$ .50	$ .50	$ .50	$ .70	....	$ .65	$ .70
15–15.9	.70	.70	.70	....	....	.70	.70	....	.50	.50	.50	.50	.50	.70	....	.65	.70
16–16.9	.70	.70	.70	....	....	.70	.70	....	.50	.50	.50	.50	.50	.70	....	.65	.70
17–17.9	.70	.70	.70	....	....	.70	.70	....	.50	.50	.50	.50	.50	.70	....	.65	.70
18–18.9	.75	.75	.75	....	....	.75	.75	....	.50	.56	.56	.56	.56	.70	....	.70	.75
19–19.9	.80	.80	.80	....	....	.80	.80	....	.50	.62	.62	.62	.62	.75	$1.65	.70	.80
20–20.9	.85	.85	.85	....	....	.84	.84	....	....	.68	.68	.68	.68	.80	for	.70	.85
21–21.9	.89	.89	.89	....	....	.88	.88	.89	....	.74	.74	.74	.74	.85	55°	.86	.86
22–22.9	.93	.93	.93	....	....	.91	.91	.92	....	.80	.80	.80	.80	.90	gravity	.87	.87
23–23.9	.97	.97	.97	....	....	....	.94	.95	....	.85	.85	.85	.85	.95	and	.90	.90
24–24.9	1.01	1.01	1.01	1.01	....	....	.97	.98	....	.90	.90	.88	.88	.98	over	.94	.94
25–25.9	1.05	1.05	1.05	1.05	....	....	1.00	1.01	....	.95	.95	.91	.91	1.01	....	.98	.98
26–26.9	1.09	1.09	1.09	1.09	....	....	1.04	1.04	....	1.00	1.00	.94	.94	1.04	....	1.02	1.02
27–27.9	1.13	1.13	1.13	1.13	....	....	1.08	1.07	....	1.05	1.05	.98	.97	1.07	....	....	1.06
28–28.9	1.17	1.17	1.17	1.17	....	....	1.12	1.10	....	1.10	1.10	1.02	....	1.10	....	....	1.10
29–29.9	1.21	....	1.21	1.21	....	....	1.16	1.15	....	1.16	1.16	1.06	....	1.13	....	....	1.14
30–30.9	1.25	....	1.25	1.25	....	....	1.20	1.20	....	1.22	1.22	1.10	....	1.16	....	....	1.18
31–31.9	1.30	....	1.30	1.30	....	....	....	1.25	....	1.28	1.28	1.14	....	....	....	....	1.23
32–32.9	1.35	....	....	1.35	....	....	....	1.30	....	1.34	1.34	1.18	....	....	....	....	1.28
33–33.9	....	....	....	1.41	....	....	....	1.35	....	1.40	1.40	1.22	....	....	....	....	1.34
34–34.9	....	....	....	1.47	$1.16	....	....	1.40	....	....	1.46	1.26	....	....	....	....	....
35–35.9	....	....	....	1.53	1.22	....	....	1.45	....	....	1.52	1.30	....	....	....	....	....
36–36.9	....	....	....	1.59	1.28	....	....	1.50	....	....	....	....	....	....	....	....	....
37–37.9	....	....	....	1.65	1.34	....	....	1.55	....	....	....	....	....	....	....	....	....
38–38.9	....	....	....	1.71	1.40	....	....	1.60	....	....	....	....	....	....	....	....	....
39–39.9	....	....	....	1.77	1.46	....	....	1.65	....	....	....	....	....	....	....	....	....
40–40.9	....	....	....	1.83	1.52	....	....	....	....	....	....	....	....	....	....	....	....
41–41.9	....	....	....	1.89	1.58	....	....	....	....	....	....	....	....	....	....	....	....
42–42.9	....	....	....	1.95	1.64	....	....	....	....	....	....	....	....	....	....	....	....

*Santa Maria and Ventura postings are by Union Oil Co. Union Oil Co. posts same prices in all above fields as Standard except it does not post prices in Wheeler Ridge, Whittier, La Habra, Newhall and Kettleman Hills. Standard does not contract for crude testing 11-13.9 gravity, but pays 45c a barrel when purchased.

†Richfield posted only to 30-30.9 at $1.25.

REFINERS' and COMPOUNDERS' SUPPLIES

Following are average market prices for materials used by refiners and compounders effective on the date shown.

Refiners' Supplies

	Dec. 9	Dec. 2
Soda Ash light 58% bags, cwt.	$1.32	$1.32
Silicate of Soda 60 deg. drums, cwt.	$1.55	$1.55
Silicate of Soda 40 deg. tank cars, cwt.	$0.60	$0.60
Silicate of Soda 40 deg. drums cwt.	$0.80	$0.80
Sal Soda wks.	$1.00–1.05	$1.00–1.05
Caustic Soda 76% solid, cwt.	$2.90	$2.90
Sulfuric Acid 60 deg. tank cars, f.o.b. shipping point per ton	$11.00	$11.00
Oleum 20%, fuming sulfuric, tank cars, wks.	$18.50	$18.50
Sulfur, flowers of, cwt.	$3.10–4.00	$3.10–4.00
Liquid Chlorine, tank cars, wks., lb.	3.50–5.00	3.50–5.00

Compounders' Supplies

	Dec. 9	Dec. 2
Vegetable Oils		
Linseed carloads, spot, lb.	14.80	14.80
Tanks, spot	14.00	14.00
Soya Bean, Tanks, coast, lb.	10.50-11.00	10.50-11.00
Oleic Acid		
Distilled, tanks, lb.	9.75	9.75
Distilled, bbls., lb.	10.625	10.625
Saponified, tanks, lb.	9.75	9.75
Saponified, bbls., lb.	10.625	10.625
Lard Oils		
Prime Winter Strained, lb.	15.25	15.25
Extra Winter Strained, lb.	12.75	12.75
Extra, lb.	12.50	12.50
Extra No. 1, lb.	12.00	12.00
No. 1, lb.	11.75	11.75
No. 2, lb.	11.50	11.50
Tallow oil, lb.	11.00	11.00
Neatsfoot Oil		
Pure, bbls., lb.	14.50	14.50
Extra, bbls., lb.	12.25	12.25
No. 1 bbls., lb.	12.00	12.00
Cold Pressed, lb.	12.50	12.50
Fish Oils		
Menhaden Oil		
Light Pressed, gal.	70	70
Light Pressed, tank cars, N. Y., gal.	58–60	58–60
White bleached, gal.	76	76
Yellow bleached, gal.	71	71
Whale, extra winter bleached, gal.	82	82
Naval Stores		
Steam, distilled turpentine, N. Y., gal.	51	50
Steam distilled turpentine, Savannah, gal.	46	47
Gum turpentine, N. Y., gal.	55	53
Gum turpentine, f.o.b. cars Savannah, gal.	49.25	47
Wood Rosin F, N. Y., gal.	$7.30	$7.70
Wood Rosin F, Savn'h, bbl.	$6.50	$6.90
Gum Rosin B, N. Y., bbl.	$8.00	$8.30
Gum Rosin B, f.o.b. cars Savannah, bbl.	$7.30	$7.60
Rosin oil, pure, gal.	58	58
Rosin oil, compounded, gal.	47	47
Pine Tar		
Kiln burnt, bbl.	$13.00–14.00	$13.00–14.00
Retort, bbl.	$13.50–14.50	$13.50–14.50
Alcohol		
Denatured Formula 5, in bbls., per gal.	59–66	59–66

OIL STOCKS AND FINANCES

National Petroleum News

Standard Oil Cash Dividends Set All Time Record

CLEVELAND, Dec. 8

CASH dividend payments of the companies called the Standard Oil group, set a new record in the fourth quarter of 1929 for quarterly payments and brought the year's cash payments also to a new high mark, according to Carl H. Pforzheimer & Co., New York, specialists in Standard Oil stock. The fourth quarter payments totaled $75,063,856 and the 1929 payments $269,645,927, an increase of more than $50,000,000 over previous record payments in any year.

Besides the cash dividends South Penn Oil Co. paid 50 per cent extra in stock in January, Standard Oil Co. of Indiana 50 per cent in March, Prairie Pipe Line Co. 25 per cent in January, and Standard Oil Co. of California 2 per cent in November.

The fourth quarter payments increased $9,636,875 over the third quarter, reflecting extra payments by Standard Oil Co. of Indiana, Standard Oil Co. of Kentucky, Ohio Oil Co., and Vacuum Oil Co., as well as a special dividend from capital reduction account by Southern Pipe Line Co.

The total cash dividend payments of the group for 1929 of $269,645,927 with only three minor payments of the last quarter estimated, is an increase of $50,905,592 over the total of $218,740,335 for 1928.

Standard Oil Co. of Indiana again accounted for considerable portion of this increase, its payments of 1929 being $45,262,757 against $32,416,529 in 1928, a gain of $12,846,228. This increase was achieved through payment of extra dividends of 50 cents a share in the first quarter and 25 cents a share for the fourth quarter, on the increased capitalization resulting from the 50 per cent stock dividend. It has paid regular dividends of 62½ cents a share each quarter.

The Standard Oil Co. of New Jersey maintaining an extra dividend of 25 cents a share for the last three quarters of 1929 brought its total payments for 1929 to $46,416,563, an increase of $9,832,447 over 1928.

Prairie Pipe Line Co. paid a total of $20,250,000 in 1929 against $8,505,000 in 1928, a gain of $11,745,000. The 1929 distributions were also swelled materially by increased payments of International Petroleum Co., Ltd., Imperial Oil, Ltd., Atlantic Refining Co. and Anglo-American Oil Co.

South Penn Oil Co. declared an extra dividend of 12½ cents a share in the last quarter, while Humble Oil declared 50 cents a share regularly against 20 cents regular and 30 cents extra in the third quarter.

Standard Oil pipe line companies made special distributions from capital reduction account during 1929 totaling $6,200,000 as follows: New York Transit Co. $3,100,000; Indiana Pipe Line Co., $2,000,000, and Southern Pipe Line Co., $1,100,000.

Cash dividends of the group since the dissolution of the old Standard Oil Co. of New Jersey are given by quarters and years in the accompanying table.

Standard Oil Cash Dividends Since Dissolution

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Totals
1929	$63,101,701	$66,053,389	$65,426,981	$75,063,856	$269,645,927
1928	48,927,670	57,694,206	50,068,102	62,050,357	218,740,335
1927	55,873,413	54,291,615	47,728,440	55,804,755	213,698,223
1926	40,580,317	¶50,618,451	46,443,278	62,685,548	200,327,594
1925	34,355,618	41,905,728	35,140,584	42,104,169	153,506,099
1924	34,975,867	40,699,592	34,712,810	40,000,286	150,388,555
1923	33,499,988	36,311,251	31,066,251	37,545,805	138,423,295
1922	28,206,068	29,205,349	28,628,099	§43,000,349	129,039,865
1921	28,987,611	29,131,727	27,609,227	29,586,727	115,294,292
1920	26,796,606	27,313,396	29,804,557	31,861,824	115,776,793
1919	26,759,502	26,397,119	24,418,169	28,326,687	105,901,477
1918	26,483,747	26,759,002	26,204,915	24,035,252	103,480,916
1917	23,097,668	26,428,252	22,968,751	27,463,252	99,957,923
1916	22,179,085	‡30,406,454	21,980,168	24,062,168	98,627,875
1915	15,241,966	14,368,636	15,891,966	16,898,636	62,401,204
1914	17,904,636	16,426,306	14,430,626	14,931,306	62,692,884
1913	†55,652,423	15,552,096	15,213,746	21,377,096	107,795,361
1912	10,220,396	11,983,746	13,190,396	16,392,096	51,686,634

*Revised. †Includes $39,335,352 disbursed by Standard Oil Co. of New Jersey from repayment of loans to former subsidiaries. ‡Includes $6,613,786 disbursed by National Transit Co. in adjustment of capitalization. §Includes aggregate extra disbursements of $11,600,000 by four Eastern Pipe Line Companies. ¶Includes $4,000,000 paid by Southern Pipe Line Co. in partial liquidation.

Rio Grande Denies Merger Near

CLEVELAND, Dec. 9.—Denial by C. S. Jones, vice-president of Rio Grande Oil Co., that a merger is being negotiated by Rio Grande and Richfield Oil Co., is contained in a dispatch from Los Angeles. Rumors that these two companies might be consolidated in the near future have been current through the East for several weeks.

Cumberland Elects Directors

CLEVELAND, Dec. 9.—W. H. Keffer was elected a director of the Cumberland Pipe Line Co. at the company's annual meeting Dec. 5 in Winchester, Ky. Mr. Keffer succeeds D. L. Thomas. Other directors and all officers were re-elected.

Sale of Stock Enriches White Eagle $389,000

NEW YORK, Dec. 6.—White Eagle Oil & Refining Co. this week listed 15,000 additional shares of no par common stock on the New York Stock Exchange and sold 13,762 shares for $28.30 a share, bringing $389,476 cash into the treasury. Identity of the buyer was not revealed.

The remaining 1238 shares of the block have been exchanged for 413 shares of stock of the Nicholas Oil Corp. of Omaha, Neb. White Eagle, it is reported, now owns 2873 of Nicholas' 3000 outstanding capital shares.

Recent reports that a consolidation of White Eagle and Magnolia Petroleum Co., subsidiary of the Standard Oil Co. of New York, is being effected, cannot be confirmed in official quarters although press dispatches say arrangements for a merger have been completed.

White Eagle has 640,000 authorized shares of which number 490,100 are outstanding. Of the remainder 50.000 shares are reserved for option and 49,900 are reserved for warrants. Its funded debt consists of $4,309,000 5½ per cent debentures. The amount has been reduced from $5,000,000 through its sinking fund.

The White Eagle has been adding steadily to its acreage, according to its listing statement. It held oil and gas leases to 218,307 acres Sept. 30, as compared with 157,043 acres in 1928 and 137,476 acres in 1927.

(*Continued on Page* 149)

Above—*A—Flexible metal tube; B — Celinol sealing layer; C — Jacket, made of hard twisted yarn woven tightly to prevent absorption of water and oil. Pre-shrunk to prevent loosening*

The Gasoline test tells the story of the superiority of Goodrich Gasoline Hose. See below

A simple test that shows why Goodrich hose stays gasoline-tight

THE metal tubing of gasoline hose cannot be made gasoline-tight. For that reason a need has existed for a sealing layer to surround the metal tubing, that would not dissolve in gasoline. This need has been responsible for one of Goodrich's most important contributions to hose manufacture—Celinol.

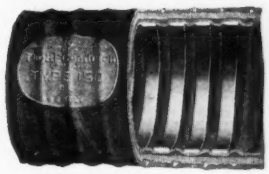
Where the sealing layer of ordinary hose is quickly dissolved by gasoline, becomes pulpy and loses its elasticity and gasoline-tightness, Celinol is immune to the solvent effects of gasoline, and keeps its tensile strength fifty percent longer.

The effect of this improvement on hose replacement costs is readily apparent.

The superiority of Celinol is so marked that we want you to prove it to yourself by this simple test. Take a small section of Celinol sealing layer and put it in a bottle filled with gasoline. Take a small section of ordinary rubber and put it in another bottle. Leave both samples immersed for sixty days. At the end of that time you will see that Celinol still retains its toughness and elasticity whereas the other rubber has become gummy, has lost its resiliency, and has discolored the gasoline.

We will gladly send a small sample of Goodrich Celinol so that you can make this test yourself. Write to The B. F. Goodrich Rubber Co., Akron, O., or send the coupon below.

Oil Suction and Discharge Hose



Scientifically balanced combination of wire, fabric and oil-proof rubber. Also made with reinforced cover and ends for sea-loading service. Dock records of leading oil companies show this hose outlasts other makes 25% to 50%.

Goodrich Distillate Hose

For conducting fuel oil. The oil proof tube and cover are the result of years of chemical research work. This hose contains no metal. Light and flexible. Furnished in long lengths. Sizes—1", 1¼", 1½", and 2".

The Goodrich Guarantee

Guaranteed against defect for 24 months after hose is placed in service—a copy of the guarantee is attached to every length before it leaves the factory.

Goodrich

THE B. F. GOODRICH RUBBER CO., N.P.N. 13
Akron, Ohio

Gentlemen: Please send me a small sample of Celinol sealing layer so that I may test its superiority myself.

Name .....

Firm .....

Address .....

Transactions in Oil Shares on New York Stock Exchange

1928 High	1928 Low	1929 High	1929 Low	Listed Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended Dec. 7 Sales	First	High	Low	Last	Change
43⅞	27⅛	42⅝	17½	(sh) 922,075	N.P.	Amerada Corp	50cQ	Oct. 31, 29	5,900	22	22	21¼	21½	— ⅜
85	51¼	64¾	12½	(sh) 209,180	N.P.	American Republics Corp	....	.....	21,000	20¼	26⅛	20¼	25½	+ 5½
53⅜	37½	47¼	40	$56,000,000	$25	Associated Oil	50cQ	Sept. 30, 29	80	35	39½	35	39½	— ½
62½	50	77⅞	30	50,000,000	25	Atlantic Refining	‡25cQ	Sept. 15, 29	84,000	41¾	43½	40⅝	42½	+ 1½
53	20	49⅛	20	47,261,125	25	Barnsdall Corp. A	50cQ	Nov. 7, 29	114,000	26⅜	28½	25½	27⅛	+ 1⅜
51⅛	20	49	38⅛	300,525	25	do B	50cQ	Nov. 7, 29	.....	.....	.....	.....	.....	.....
24½	12¼	32⅞	15	(sh) 956,075	N.P.	Beacon Oil	....	.....	17,000	17	17⅞	17	17	+ ½
36	25¼	34½	25	$51,524,150	$25	California Petroleum	....	Jan. 1, 29	20	28	28	28	28	0
.....	.....	37¾	18	(sh) 4,634,163	N.P.	Continental Oil (Delaware)	....	.....	62,600	26⅞	27¾	26	27⅛	+ ¾
94⅞	68	94¾	42¼	21,031,400	100	General Asphalt	....	.....	29,500	50¾	57	50⅛	55¾	+ 5⅜
141	110½	138	103½	6,628,200	100	do pfd	$1.25Q	Dec. 2, 29	.....	.....	.....	.....	.....	.....
67	79	109	23	25,000,000	100	Houston Oil	....	.....	39,900	49	61¾	47½	60⅜	+13¾
38¾	21¾	39¼	17¾	(sh) 1,333,157	N.P.	Independent Oil & Gas	50cQ	Oct. 31, 29	23,200	24¾	25¾	24¾	24¾	+ ⅛
39⅝	9	53	13	$4,299,190	$10	Indian Refining	....	Dec. 15, 20	79,200	19¾	24⅛	19	22½	+ 3
37¼	8½	51¼	11½	4,550,110	10	do ctfs	....	.....	18,100	17½	23	17½	20¼	+ 1½
185	140	165	160	1,977,700	100	do pfd. new	$1.75Q	Oct. 1, 29	.....	.....	.....	.....	.....	.....
39⅛	27⅜	38⅜	16½	3,992,387	N.P.	Lago Oil & Transport	....	May 2, 27	500	21½	22⅜	21⅜	22⅜	0
119¾	93⅜	18	7	(sh) 1,187,298	N.P.	Louisiana Oil Refining	....	.....	9,400	9¾	10⅛	9⅜	9⅞	+ ⅛
96	78	100¼	80	$4,000,000	$100	do pfd	$1.62½	Nov. 15, 29	10	80	80	80	80	— 5
25½	12½	18½	7½	(sh) 330,000	N.P.	Maracaibo Oil	....	.....	2,500	7½	8⅛	†7½	8	— 2
360	250	295	176	$45,942,800	$100	Mexican Petroleum	$3Q	Oct. 20, 29	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	12,000,000	100	do pfd	$2Q	Oct. 20, 29	.....	.....	.....	.....	.....	.....
73	45⅝	69⅜	9¼	(sh) 995,500	N.P.	Mexican Seaboard	....	Nov. 15, 24	1,700	17¼	23¾	17¼	22	+ 4
44½	25⅛	39⅞	22⅛	(sh) 1,857,461	N.P.	Mid-Continent	50cQ	Nov. 15, 29	11,500	28¼	29¾	27⅜	29½	+ ¾
120½	103¼	121	120¼	$6,718,000	$100	do pfd	$1.75Q	Sept. 1, 29	.....	.....	.....	.....	.....	.....
7⅜	2⅜	5⅛	¾	23,849,720	10	Middle States	....	July 1, 23	.....	.....	.....	.....	.....	.....
5⅞	1½	3⅝	⅞	5,950,500	10	do ctfs	....	.....	5,600	1¼	1¼	1	1	— ⅛
2¼	1	1½	⅝	(sh) 3,500,000	N.P.	Pacific Oil	....	.....	19,800	⅞	1	⅞	1	+ ⅛
55½	38¼	69	40¼	$50,000,000	$50	Pan American P. & T	....	Oct. 20, 27	2,300	59¼	62⅜	59¼	62	+ 1
58⅞	37¾	69¼	40½	121,101,400	50	do B	....	Oct. 20, 27	7,400	60½	62¾	58½	62	+ 1
28⅜	15½	17½	13½	(sh) 400,000	N.P.	Pan. American Western B	....	Jan. 30, 27	.....	.....	.....	.....	.....	.....
21¾	11½	15¼	3	(sh) 199,370	N.P.	Panhandle P. & R	....	.....	4,000	5	6¾	5	6	+ 1
106¼	70	76	47½	$2,935,200	$100	do pfd	....	July 2, 23	200	50	50	50	50	0
53⅞	35¼	47	24¼	(sh) 2,406,803	N.P.	Phillips Petroleum	37½cQ	Oct. 1, 29	43,300	37⅞	39½	36⅜	39½	+ 1½
5¼	½	3⅜	1	$29,622,925	$25	Pierce Oil Corp	....	.....	1,900	1⅜	1⅜	1⅛	1⅛	— ⅛
50	16¼	51½	20	15,000,000	100	do pfd	....	Feb. 1, 22	700	25	26½	25	26½	— ½
6⅝	3½	5⅞	½	(sh) 2,500,000	N.P.	Pierce Petroleum	....	.....	4,100	2⅞	2⅞	2⅝	2¾	+ ⅛
64⅝	59½	65⅜	40½	$60,636,450	$25	Prairie Oil & Gas	‡50cQ	Sept. 30, 29	8,400	55¾	56¾	55½	56¼	+ ½
.....	....	65	45	101,250,000	25	Prairie Pipe Line	‡76cQ	Sept. 30, 29	9,200	59⅛	59⅞	58¼	58¾	— ⅛
29⅜	16	25⅞	4	37,450,850	50	Producers & Refiners	....	Sept. 15, 23	4,100	9⅞	11⅞	9⅛	11	+ 2
49⅝	41	46⅝	25½	2,845,350	50	do pfd	....	May 1, 25	120	32½	32½	32½	32½	0
31¼	19	30¾	20	75,959,255	25	Pure Oil Co	37½cQ	Sept. 1, 29	28,900	23⅞	24½	23	24½	+ 1⅜
119	108	116	108	13,000,000	100	do 8% pfd	$2Q	Oct. 1, 29	210	111½	113¾	111	113¾	+ 2¾
56	23½	49⅝	20	47,127,725	25	Richfield Oil	50cQ	Nov. 15, 29	25,900	28⅞	29⅞	28½	29⅜	+ ⅜
.....	.....	42½	15	(sh) 1,200,000	N.P.	Rio Grande Oil Co	‡$1S.A.	July 25, 29	40,900	18⅞	21½	18	21½	+ 2½
64	44⅝	64	43⅛	(sh) 546,646	$13.40	Royal Dutch N. Y. shares	$1.873	Aug. 10, 29	41,000	52⅜	55⅜	52⅜	53¾	+ 1¼
57½	39⅜	55¾	43	(sh) 65,203,000	£2	Shell Transport & T	$1.447	July 23, 29	.....	.....	.....	.....	.....	.....
39⅜	23¼	31¾	19	12,254,979	N.P.	Shell Union Oil	35cQ	Sept. 30, 29	15,100	23½	24½	23⅛	24¼	+ ⅜
27¼	18⅛	40⅛	15	$8,357,280	$10	Simms Petroleum	40cQ	Sept. 14, 29	11,200	22½	29	22½	29	+ 5⅞
46¾	17⅜	45	21	5,494,095	N.P.	Sinclair Consolidated	‡50cQ	Oct. 15, 29	69,800	26⅝	28¼	26¼	27¾	+ 1½
110	102½	111	103	$16,025,200	$100	do pfd	$2Q	Nov. 15, 29	300	108⅛	109	108⅛	109	+ 1¼
42⅝	25	46½	28	27,396,590	25	Skelly Oil Co	50cQ	Sept. 16, 29	12,900	33⅞	34½	33⅜	33½	— ⅜
80	53	81⅞	51½	(sh) 13,016,435	N.P.	S. O. California	62½cQ	Sept. 16, 29	25,600	62	66¾	62	65⅜	+ 3⅜
59⅜	37¾	83	48	$612,095,850	$25	S. O. New Jersey	‡25cQ	Sept. 16, 29	219,100	64	69⅜	62⅛	69¼	+ 5¼
45½	28¾	48⅛	31¾	434,094,575	25	S. O. New York	40cQ	Sept. 16, 29	53,400	35¼	36¼	34½	35⅞	+ ⅜
77	31½	84¾	55½	(sh) 1,297,847	N.P.	Sun Oil	25cQ	Sept. 16, 29	2,200	60	61½	59⅞	60	0
110	110	105½	100	$5,000,000	$100	do pfd	$1.50Q	Dec. 2, 29	160	103	103½	102½	103½	+ ⅜
14¼	2½	24	5¼	(sh) 1,304,698	N.P.	Superior Oil Corp	....	Dec. 20, 20	14,000	7⅞	8⅜	7¼	7¾	— ¼
74⅜	50	71⅞	50	$211,082,925	$25	The Texas Corp	75cQ	Oct. 1, 29	44,900	56⅜	59⅜	55¾	59⅜	+ 4⅛
26⅝	12⅛	23⅞	9½	8,380,340	10	Texas Pacific Coal & Oil	2½%s	Sept. 30, 29	13,100	11⅞	11⅞	11	11¼	— ⅛
41½	19⅜	40	14	(sh) 2,179,275	N.P.	Tide Water Oil Co	20cQ	Sept. 30, 29	500	20⅜	22½	20⅜	22½	+ 2⅜
100⅛	86¾	97½	85⅛	$20,321,000	$100	do 5½% pfd	$1.25Q	Nov. 15, 29	500	88	88¼	87¾	88¼	+ ¼
25	14¾	23½	10	(sh) 4,877,976	N.P.	Tide Water Associated	....	Aug. 1, 27	38,500	13⅜	14⅛	12¾	14⅛	+ 1⅛
91¾	81⅞	90⅞	74⅛	$72,989,200	$100	do pfd	$1.50Q	Oct. 1, 29	2,000	81½	83	81⅛	83	+ 1½
14½	6¾	15¼	5⅛	(sh) 3,842,029	N.P.	Transcontinental Oil	....	.....	116,000	8⅞	9½	8½	9¼	+ ¼
58	42¾	54½	42⅛	$40,858,375	$25	Union Oil of California	‡50cQ	Nov. 9, 29	7,000	44¾	47⅞	44¾	47¾	+ 3
128⅛	110	163¾	121⅞	31,101,200	100	Union Tank Car Co	$1.25Q	Dec. 2, 29	200	150	150	150	150	+10
44⅞	26	42⅞	15	(sh) 488,359	N.P.	Warner Quinlan	50cQ	Oct. 1, 29	8,100	23	24	22¾	23	— ½
38	20⅛	38	25	(sh) 490,000	N.P.	White Eagle Oil & Refining	50cQ	Oct. 21, 29	1,500	28½	29¾	28½	29½	+ 1¼
22⅛	17¼	29¾	12⅞	(sh) 428,967	N.P.	Wilcox Oil & Gas	....	May 10, 28	3,000	15¼	16½	15	15⅛	— ⅜

*New High †New Low xEx-Dividends ‡Also Extras s-Stock Total Sales 1,427,200

Pittsburgh Stock Exchange

Transactions Week Ended Dec. 6, 1929

	Sales	High	Low	Last	Change
Ark. Nat. Gas	1,795	11½	11	11¼	+ ¼
do pfd	2,695	8	7¾	8	+ ¼
Devonian Oil	355	11	10⅛	11	+ ¾
Dixie Gas & Util.	15	14⅝	14	14	—16
do pfd	10	70	70	70	—2
Lone Star Gas	9,625	40	33½	39⅛	+5½
Lone Star pfd	295	105	104	105	+1
Plymouth Oil	380	29	28½	29	+ ½
Pgh. Oil & Gas	225	3¼	3¼	3¼	0
Salt Creek Cons.	350	2½	2¼	2½	0
Shamrock Oil & Gas	970	16	15¾	16	0
Wiser Oil	228	18½	16	16	0

Pittsburgh Curb Market

Transactions Week Ended Dec. 6, 1929

	Sales	High	Low	Last	Change
Ark "A"	600	11	10½	10½	....
Columbia Syndicate	800	⅝	⅝	⅝	....
Mountain Prod.	200	9⅝	9⅝	9⅝	....

Doherty Men Hold Dinner

CHICAGO, Dec. 5.—Members of the Henry L. Doherty & Co. organization that attended the American Petroleum Institute convention, held a dinner Dec. 3 at the Blackstone hotel.

R. L. Heaton Now With Paschall

CHICAGO, Dec. 9.—Irving F. Paschall, of the advertising firm of Paschall, Harris & Paschall, announces that R. L. Heaton, for many years connected with S. F. Bowser & Co., Inc., Fort Wayne, Ind., as sales promotion and advertising manager, has joined the Paschall organization and has been elected treasurer. He is to be general manager of the company's western office. The company also announces it is opening an eastern office in Philadelphia about the first of the year. W. L. Paschall, son of Irvin F. Paschall, will be at the eastern office. Mr. Paschall, Sr., will be president of both the Illinois and Pennsylvania corporations.

PITTSBURGH, Pa., Dec. 7.—J. H. Hill, for the past 22 years with the Pittsburgh Equitable Meter Co., maker of gasoline, oil, gas and water meters and regulators, has resigned Dec. 1, to devote his entire time to private business interests. Mr. Hill was for the past 15 years district manager at Los Angeles.

Walter H. Davis, representative for the company for the past 15 years in Kansas and Missouri, succeeds Mr. Hill as district manager at Los Angeles. A building at 1918 East Seventh street has been leased in Los Angeles by the company, to house the office and plant.

Oil Dividends

	Amount	Payable	Stock of Record
Humble Oil q	50c	Jan. 1	Dec. 12
Mexican Pet. q	$3	Jan. 20	Dec. 31
do pfd. q	$2	Jan. 20	Dec. 31
Mountain Prod. q	40c	Jan. 2	Dec. 14
N. Cent. Texas pfd. q	$1.62½	Jan. 2	Dec. 10
Richfield Oil pfd. q	43¾c	Feb. 1	Jan. 4
Salt Creek Cons. q	10c	Jan. 2	Dec. 15
South Penn q	50c	Dec. 30	Dec. 14
do extra	12½c	Dec. 30	Dec. 14
S. W. Pa. Pipe Lines q	$1	Dec. 31	Dec. 14
Tide Water Oil q	20c	Dec. 31	Dec. 9
Tide Water Associated pfd. q.	$1.50	Jan. 2	Dec. 9
West Coast Oil pfd. q	$1.50	Jan. 6	Dec. 20

Sale of Stock Enriches White Eagle $389,000

(*Continued from Page* 146)

Of the total, 5097 acres are developed. Crude oil production by the company Nov. 1 was 4127 barrels net, while during the first nine months this year it produced a total of 405,935 barrels, valued at $556,437, from 162 wells compared with 745,656 barrels, valued at $964,407 from 156 wells in all 1928, and 802,752 barrels, valued at $976,563 from 150 wells in 1927.

Operations at the three refineries, located at Fort Worth, Tex., Casper, Wyo., and Augusta, Kans., with combined capacity of 21,000 barrels daily, have been increased this year. In the first nine months their output amounted to 3,712,508 barrels, compared with 3,507,406 barrels in the full year 1928 and 3,479,403 barrels in 1927. The plants have storage capacity of 3,100,000 barrels of oil and loading capacity of 191 cars daily.

Of the 1175 marketing stations which it operates through the central west territory, the company owns 765. These are equipped with storage capacity aggregating 15,000,000 gallons and consume 73 per cent of the output of gasoline and kerosene of the White Eagle refineries.

Sales this year have increased, totaling 82,763,238 gallons of refined products, distributed through stations operated by the company, in the first nine months this year, compared with 93,514,074 gallons in all 1928, and 85,739,963 gallons in 1927. Sales of crude oil and refined products aggregated 162,208,748 gallons this year to Sept. 30, whereas in all last year they amounted to 187,648,534 gallons, and in 1927 were 182,205,639 gallons.

Richfield Buys Two Tankers

CLEVELAND, Dec. 9.—Richfield Oil Co. has bought the tankers Agwiworld and Huguenot of 10,600 and 10,307 deadweight tons, respectively. These two vessels bring the Richfield fleet up to nine tankers with a cargo transport capacity of 628,000 barrels total. Richfield also operates tankers under charter.

Brooks Stations Only Sold To Paragon

CLEVELAND, O., Dec. 7.—Some confusion has arisen as to the extent of the properties and business involved in the sale of the Brooks Oil Co. service stations last December to the Paragon Refining Co., Toledo. Only the service stations of the Brooks company, totaling about 60, and 100,000 gallons of bulk storage, were sold at that time to the Paragon.

The Brooks company has retained all of its industrial gasoline business, as well as all of its oil, grease, soap and paint business, in which it has engaged for the past 33 years in Cleveland.

THE OIL INDUSTRY EXCHANGE

Positions Wanted

STATION AUDITOR—Division office accountant-salesman; several years experience; desires new connection. Single, age 38. Address Taylor, 612 N. Newstead, St. Louis, Mo.

MR. GENERAL MANAGER! Position wanted as SUPT. ENGINEER or MARINE SUPERINTENDENT for Tanker Fleet. Have thoro technical education and plenty of practical experience. Can cut costs and manage steamers efficiently. Address Box 459.

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Situations Open

Heat Transfer equipment manufacturer desires Sales Engineers, Calculating Engineers and Designers experienced in the Power Plant, Petroleum, Refrigeration and Industrial Fields. Excellent opportunities for proper applicants. Give full information in first letter. All replies considered strictly confidential. Write Heat Transfer Products Inc. affiliated with American Locomotive Company, 30 Church St., New York City.

SIDE LINE SALESMEN WANTED to sell Graphite Penetrating Oil. Big commissions, wonderful oil and selling plans, with free spray gun. Nourse Oil Company, Kansas City, Missouri.

BUYER WANTED

thoroughly conversant with crude and refined oils, to take charge of N. Y. office. Write fully, stating connections, experience, salary required, etc.

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342 Madison Ave.

New York City

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Address Box 420.

PERMANENT GASOLINE OUTLET

Super-Service Station with 200-car parking garage. Bulk storage. Good gallonage. Maximum profit. Owner overtaxed with business. Real opportunity.

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SERVICE STATION FOR SALE with bulk storage on own rail doing large retail business, but exceptionally adapted for distribution outlet. Twenty thousand gasoline storage, permit for twenty thousand more. Twelve thousand oil storage. Big battery business. Situated main highway from Lawrence to Haverhill. Lawrence one mile, Haverhill six miles, Lowell nine miles, Salem, Danvers, Peabody, twenty miles. James J. Sullivan, Sutton's Cor., North Andover, Mass.

TANK CARS FOR SALE

8000 gallon, now in gasoline service. Inspection at Kansas City or Okmulgee, Okla. Bargain prices.

M. R. Ducey Ry. Car Co.,
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FOR SALE

Sweetland Filters—laboratory size to No. 10. Kelly Filters— No. 150, 250, 450. Pumps, Tanks, etc. Send for complete lists.

Stein-Brill Corporation,
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in Pennsylvania, unusually well located. Fully equipped for refining all products crude petroleum, including motor oils, neutrals and bright stock.

Address Box 458

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Standard Oil Stocks on New York Curb

1928 High	1928 Low	1929 High	1929 Low	Outstanding Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended Dec. 7 Sales	First	High	Low	Last	Change
22⅜	14⅞	18¾	14¼	£4,126,460	£ 1	Anglo-American Oil	36c	June 5, 29	.....	....	....	....	....	....
21¼	15	18	13	.....	....	do certificates	36c	June 5, 29	68,300	16⅞	17	16¼	16¼	— ¾
20½	14⅜	17	11	.....	£ 1	do ctfs. non-voting	36c	June 5, 29	10,200	16⅞	16⅞	16⅜	16⅜	— ⅞
5	1¼	2½	.75	(sh) 500,000	N.P.	Atlantic Lobos	.....	.....	300	¾	¾	¾	¾	0
9¾	3¼	4⅛	1	$10,000,000	$50	do pfd	.....	.....	700	1⅜	1⅜	1¼	1¼	0
56	44½	46½	25	$1,000,000	25	Borne-Scrymser	$1 S.A.	Oct. 15, 29	400	26	26	25	25	— 2¾
76	58	74¼	55	10,000,000	50	Buckeye Pipe Line	‡$1Q	Sept. 14, 29	1,800	68⅞	69⅞	67	69½	+ 1¼
161	117¼	210	130	3,000,000	25	Chesebrough Mfg	‡$1Q	Sept. 30, 29	900	149	167¼	149	167¼	+22½
23	16	29	8⅛	36,123,350	10	Continental Oil	.....	Dec. 15, 27	2,100	15¼	16⅛	15¼	16	+ 1
17½	9½	11¾	5⅝	.....	N.P.	Creole Petroleum	.....	.....	89,200	6¾	7	6⅝	6¾	0
82	67	95	40	1,500,000	50	Cumberland Pipe Line	$1Q	Sept. 16, 29	150	52½	52¾	52½	52¾	+ 9¾
88	64⅛	70½	42	5,000,000	100	Eureka Pipe Line	$1Q	Nov. 1, 29	800	45	54½	45	54⅛	+11⅛
13	4¼	7	3⅝	16,000,000	100	Galena Signal Oil	.....	June 30, 25	800	3⅝	5	†3⅝	3⅝	— 1⅜
86	26	90	73½	4,000,000	100	do new pfd	.....	June 30, 26	.....	....	....	....	....	....
89¾	35	88	73½	2,000,000	100	do old pfd	.....	June 30, 26	.....	....	....	....	....	....
114¾	59¼	128	74⅛	73,685,700	25	Humble Oil & Refining	‡30cQ	Oct. 1, 29	6,300	87⅛	93⅞	87⅛	93⅞	+ 4⅞
290½	176½	340½	260	20,000,000	100	Illinois Pipe Line	$10S.A.	June 15, 29	3,900	310	329¾	310	329¾	+193¾
104	56¾	41	22	(sh) 26,421,768	N.P.	Imperial of Canada	12½cQ	Dec. 2, 29	4,900	27½	29½	27½	29	+ 1⅝
91⅞	74⅝	41⅞	26	$1,000,000	$10	Indiana Pipe Line	‡50cQ	Nov. 15, 29	8,400	39⅞	*41⅞	38⅜	41	+ 1¾
55	35	29⅜	15	(sh) 14,247,088	N.P.	International Petroleum	12½c	June 25, 29	8,900	21⅞	24½	21⅞	23½	+ 1½
32⅜	19⅜	25⅞	10½	$6,363,350	12.50	National Transit Co	25cQ	Sept. 16, 29	11,000	22⅝	24½	22½	23	+ ⅞
75	38½	85	72	1,000,000	10	New York Transit	40c	Oct. 15, 29	.....	....	....	....	....	....
....	....	....	....	.....	....	do new	.....	.....	100	17¾	17¾	17¾	17¾	0
69	56½	63	41	2,000,000	50	Northern Pipe Line	$2 S.A.	July 1, 29	100	51¾	51¾	51¾	51¾	0
83½	58½	79⅞	64⅛	60,000,000	25	Ohio Oil Co	50cQ	Sept. 14, 29	1,000	71⅛	71⅜	70¾	71	0
84	28	44½	20	10,000,000	25	Penn Mex. Fuel	$1	Sept. 30, 29	300	22⅞	22⅞	20	20	0
220	167	50	33	4,000,000	25	Solar Refining	$1.25S.A.	June 20, 29	100	35⅞	35⅞	34	34	— 2½
19	12	23½	13	1,000,000	10	Southern Pipe Line	$1	Mar. 1, 29	.....	....	....	....	....	....
71⅞	36¾	60¼	35⅛	30,000,000	25	South Penn Oil	50cQ	Sept. 30, 29	3,700	41⅝	42	41⅜	41⅞	0
102	70	70	45	1,750,000	50	South West Pa. Pipe Lines	$1	Oct. 1, 29	.....	....	....	....	....	....
95⅞	70⅞	63	45	348,175,069	25	S. O. Indiana	62½cQ	Sept. 16, 29	47,600	53¾	55⅝	53⅜	55⅝	+ 1⅝
27¾	15	33¾	18	8,000,000	25	S. O. Kansas	.....	June 16, 24	800	27⅜	28	26½	27⅞	+ ⅜
49	44	46⅜	29	25,654,516	10	S. O. Kentucky	40cQ	Sept. 30, 29	4,700	36¼	38¼	36	37⅝	+ 1⅝
54⅝	39⅞	50¼	40	4,649,225	25	S. O. Nebraska	‡62½cQ	Sept. 20, 29	200	43	43	43	43	0
134	71	129	60	14,000,000	25	S. O. Ohio	62½cQ	Oct. 1, 29	900	87	90	87	89	+ 1½
125	116	124½	113½	7,000,000	100	do pfd	$1.75Q	Dec. 2, 29	110	117¾	117¾	117¾	117¾	+ ¼
23½	16	18	10	861,466	25	Swan Finch	30c	Jan. 15, 29	.....	....	....	....	....	....
111	72	133¾	75	126,154,000	25	Vacuum Oil	$1Q	Sept. 20, 29	6,200	94¾	101⅜	94¾	99	+ 4¼

*New High †New Low ‡Also Extras

Independent Oils on New York Curb

1928 High	1928 Low	1929 High	1929 Low	Par Value	Stocks	Transactions Week Ended Dec. 7 Sales	First	High	Low	Last	Change
1½	.53	.72	.125	$5	Amer. Cons. Oilfields	6,400	1/16	5/16	1/8	3/16	+ 1/16
9½	3½	8⅝	1⅛	N.P.	Amer. Maracaibo	1,800	1⅞	2	1¾	1⅞	+ ⅛
4½	2¼	4¾	1⅛	$10	Argo Oil	700	1¼	1⅛	1¼	1½	+ ⅛
3¾	3⅜	26	3¾	N.P.	Arkansas Nat. Gas	8,900	11⅞	11⅞	10¼	11	— ⅞
....	....	24¾	6½	N.P.	do A	82,800	10½	10⅞	10	10⅞	+ ⅛
....	....	9	4	10	do pfd	2,600	7⅞	8	7¾	8	+ ¼
55	32¾	70	50	N.P.	British American Oil	.....	....	....	....	....	....
23⅞	3¾	4⅞	1	25c	Carib Syndicate	8,100	1⅛	1¼	1	1⅛	0
....	....	68¼	20	N.P.	Cities Service new	145,700	29¼	30⅜	28¾	20⅜	+ 1⅜
103½	94½	99¼	84	100	do pfd	1,000	89¾	90	89⅝	90	0
9⅜	8⅞	9¼	8	10	do pref. B	.....	....	....	....	....	....
97	88½	96	88	100	do pref. BB	.....	....	....	....	....	....
2¼	1	1½	¼	1	Colombia Syndicate	18,300	1/16	1/16	†¼	⅜	0
17¾	9¾	15	3⅞	N.P.	Colon Oil	8,800	6½	6⅝	6¼	6½	— ⅝
8⅞	6¼	11⅛	2½	10	Consolidated Royal	3,100	4½	4¼	4⅜	4½	0
....	....	135	42	N.P.	Cosden Oil Co	4,200	75	82½	75	82	+ 7
....	....	82	55	....	do pfd	.....	....	....	....	....	....
3¼	.76	2½	⅝	N.P.	Crown Central	1,200	¾	¾	⅝	⅝	— ⅛
15	6¾	11¾	4	N.P.	Crystal Oil	.....	....	....	....	....	....
50	48	51⅝	51⅛	$100	do pfd	.....	....	....	....	....	....
33½	8⅛	26	6½	N.P.	Darby Petroleum	700	8⅞	9	8⅝	8⅞	— ⅛
2⅞	1	11	2	N.P.	Derby Oil & Refining	3,600	5¼	5⅜	5	5⅜	+ ⅛
21⅛	7½	44	5	N.P.	do pfd	.....	....	....	....	....	....
165	101¾	209	115	$25	Gulf Oil Corp	9,600	133	147	132½	147	+13¼
7½	5⅝	7½	1⅜	5	Homaokla Oil	2,800	4	4	3⅝	3⅝	— ⅜
....	....	49¼	5	$1	Indian Territory	37,800	18½	25⅞	18	24½	+ 7
3⅜	1	2⅞	⅜	10	Intercontinental Pet.	181,400	¾	1⅛	¾	1⅛	+ ⅛
3	¼	3⅜	1¼	N.P.	Kirby Petroleum	1,900	2	2⅛	2	2	+ ¼
9⅜	5⅛	6⅛	2	N.P.	Leonard Oil & Dev	4,400	2½	2½	2⅛	2⅛	+ ⅛
43⅜	20	38⅞	18	N.P.	Lion Oil & Refg	1,800	21¼	22⅜	20⅝	22⅜	— ⅜
....	....	67⅞	28	N.P.	Lone Star Gas	1,900	34	39¾	34	39½	+ 5¾
1⅞	.50	1¼	¼	1	Magdalena Syndicate	8,800	¼	¼	¼	¼	0
48½	32	38½	15	N.P.	Margay Oil	....	....	....	....	....	....
8	2¾	6⅜	2½	N.P.	Mexico-Ohio Oil	2,900	3	3	2½	2½	— ⅝
....	....	42	8	N.P.	Missouri-Kan. P. L.	8,900	16¼	18	16¼	18	+ 1
1¾	.76	1½	¼	1	Mountain & Gulf	4,300	⅞	⅞	¾	¾	+ 1/16
28⅞	19½	22⅞	7	10	Mountain Producers	7,000	9⅝	10¼	9¼	10⅛	+ ⅛
....	....	43⅞	24	N.P.	Nat. Fuel Gas (new)	1,800	27⅜	28	27⅜	28	+ 1
5⅜	4¼	5	2¼	5	New Bradford	500	3⅛	3¼	3	3¼	— ⅛
5½	3	3⅞	2¾	10	New England Fuel	200	3	3	3	3	0
11⅞	7⅛	9⅜	2¼	1	New Mex. & Ariz	400	3	3½	2⅞	3½	+ ½
15½	11½	24½	11⅛	25	New York Petrol	1,900	15	15⅞	14⅛	15⅞	+ 1
13¼	8⅜	18½	6⅛	N.P.	North Cent. Texas	300	7⅞	8	7⅞	8	+ ¼
....	....	19¼	8⅜	N.P.	Oil Stock, Ltd. A	600	10⅛	11	10	10⅜	— ⅛
....	....	18¼	10	N.P.	do B	.....	....	....	....	....	....
26¼	20	26⅝	12⅝	N.P.	Pacific Western Oil	700	14½	15⅛	14½	14½	— ½
6	2¼	3½	⅛	N.P.	Pandem Oil	200	¾	¾	⅛	⅛	0
15⅝	8½	10½	2⅜	N.P.	Pantepec Oil	4,200	3⅝	3⅝	3	3⅛	— ½
20	10⅝	25½	22½	$25	Paragon Refg. B. ctfs.	.....	....	....	....	....	....
....	....	34½	17	N.P.	Petroleum Corp	14,300	20⅝	23¾	20½	23½	+ 2½
31⅜	26½	37	22	N.P.	Plymouth Oil	300	28½	28½	28	28	— ½
18	8	16	9⅝	25	Red Bank Oil	.....	....	....	....	....	....
13	4⅛	8½	1⅛	N.P.	Reiter-Foster	1,200	3⅛	3⅜	3	3⅛	+ ⅛
31½	23¼	25½	19	$25	Richfield pfd	.....	....	....	....	....	....
....	....	29	17	....	Root Refining pfd	.....	....	....	....	....	....
12	4⅝	11	3	N.P.	Ryan Consolidated	200	4½	4⅝	4⅛	4⅛	0
7¼	5½	5⅞	1⅞	$10	Salt Creek Cons	100	2¼	2¼	2¼	2¼	+ ¼
35	23¼	25⅞	9	10	Salt Creek Prod	1,000	12	13	11⅝	12¾	+ 1
3½	1	2½	½	5	Savoy Oil	.....	....	....	....	....	....
40	27	33⅜	32	25	Shreveport El Dorado	.....	....	....	....	....	....
....	....	24	11⅜	N.P.	Southland Royalty	1,200	13¼	13¼	12	12	— 1¼
....	....	12	4	N.P.	Sunray Oil	2,100	8½	9	7½	7½	— 1⅛
....	....	23	7⅛	N.P.	Texon Oil & Land new	1,000	9⅞	12	9½	12	+ 2
22⅞	13	16⅞	11⅝	$10	Tidal Osage	.....	....	....	....	....	....
21¼	13⅛	16½	10⅛	10	do not-voting	.....	....	....	....	....	....
93¾	75	155	80	100	Transcontinental pfd	.....	....	....	....	....	....
74¼	18	81⅛	66	10	Venezuela-Mexico	.....	....	....	....	....	....
9⅜	4¾	6½	1⅜	3	Venezuelan Petrol	5,100	2⅜	2½	2¼	2⅜	0
....	....	72¼	66	N.P.	White Star Oil	.....	....	....	....	....	....
8¼	4⅞	9⅛	2	1	Woodley Petroleum	.....	....	....	....	....	....
⅜	⅛	5⅜	½	25	Y Oil & Gas	.....	....	....	....	....	....

*New High †New Low

New York Curb Bonds

Week Ending Dec. 6, 1929

	High	Low	Last	Change
Beacon Oil 6s '36	105	103⅛	103⅛	—1⅞
Cities Serv. 5s '66	84	82⅛	84	+ ⅜
Cities Serv. G. 5½s '42	86⅞	85½	86⅜	+1
Cities Serv. G. 6s '43	94	92	92¾	+1
Cities Serv. P. 5½s '52	91	89½	90	— ⅞
Cont. Oil 5½s '37	94	92½	92½	— 1½
Empire O & R 5½s '42	86⅞	84½	86½	+1½
Gulf Oil 5s '37	101¼	99⅜	101¼	+1½
Gulf Oil 5s '47	102⅛	100⅞	101¼	+ ¼
Indep. Oil 6s '39	103⅞	102⅛	103	+ ⅞
Sun Oil 5½s '39	100½	99	100½	+1
Valvoline Oil 7s '37	103⅛	102¾	102¾	—1¼

New York Bonds

Week Ending Dec. 6, 1929

	High	Low	Last	Change
Assoc. Oil gold 6s	102	101½	102	+ ½
Atlantic Refg. deb. 5s	102¼	101¾	102	— ⅛
Cal. Pet. 5s	94½	94	94½	+ ½
Cal. Pet. 5½s	99⅛	98¾	99⅛	+ ⅜
General Pet. 5s	102⅛	100½	102⅛	+2⅛
Humble Oil & Refg. 5s	100¼	99¾	100¼	+ ¼
Humble Oil & Refg. 5½s	102	101	102	+1¼
Pan Amer. P & T 7s	105¼	104½	104½	0
Pan Amer. P & T 6s	104¼	103	103¾	+ ⅝
Pan Amer. P & T 6s	95⅜	95	95⅜	+ ⅜
Phillips Pet. 5½s	92¾	91½	92¾	+ ⅞
Pierce Oil deb. 8s	103	103	103	0
Pure Oil 5½s	100	98½	99⅞	+ ⅞
Richfield Oil of Calif. 6s	99	98	98½	0
Shell Union Oil 5s	96	94½	95	+ ½
Sinclair Con. Oil 7s	101½	101	101¼	— ⅛
Sinclair Con. Oil 6½s	100⅝	98⅞	100⅜	+1⅜
Sinclair Con. Oil 6s D	100	99½	99¾	— ⅛
Sinclair Con. Crude 5½s	97	96½	97	+ ⅜
Sinclair Pipeline 5s	95	94	95	+ ½
Skelly Oil 5½s	95⅛	92⅛	95	+3⅛
S. O. N. J. 5s	103¼	103	103	0
S. O. N. Y. 4½s	98	96	97	+1
Union Oil of Calif. 6s A	107⅜	106	107⅜	+1¼
Union Oil of Calif. 5s C	99¾	99	99	+ ½
Warner-Quinlan 6s	90	88	88	—1
White Eagle Oil 5½s	100	99½	99¾	+1

Cleveland Stock Market

Dec. 6	Par Value	Bid	Asked
Canfield Oil Co	$100	100	135
do pfd	100	102	....
Fred G. Clark Inc	10	10	11
National Refining Co	25	34	34½
do pfd	100	....	132
Paragon Refining Co	25	9½	10
do pfd	N.P.	35	41
do ctfs	....	9¾	10½